SHORTWAVE DIRECTORY

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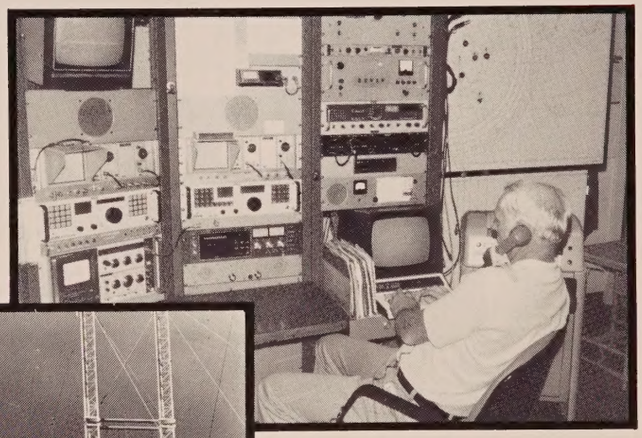
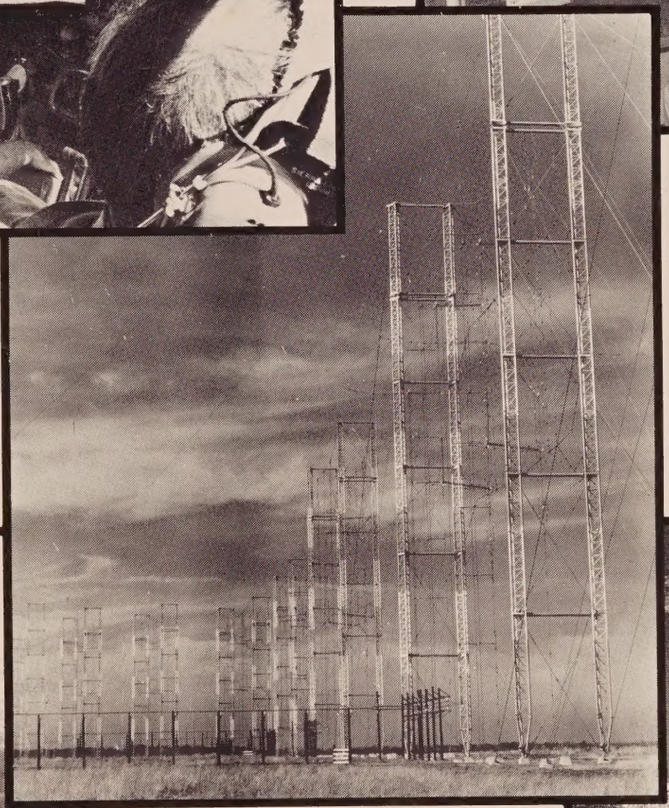
A Frequency Guide for the 1.6-30 MHz Spectrum,
Now Including International Broadcasting and VLF





FIFTH
EDITION

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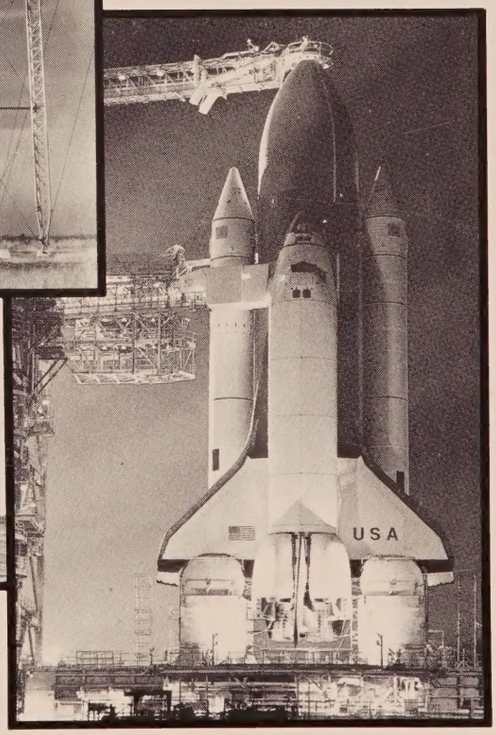
Bob Grove



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SHORTWAVE DIRECTORY

Fifth Edition

by Robert B. Grove

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ELECTROVALUE

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LISTENER'S LOG SHEET

Introduction

DXing the Utilities

"Utilities" monitoring? To the uninitiated, the terminology probably conjurs up visions of some demented radio buff tuning in water and sewer repair crews! Nothing could be further from the truth. While many shortwave hobbyists are quite content listening to foreign broadcasts, the rest of us are busily tapping in on the two-way action.

It could be a pilot radioing his position report or describing a mechanical problem he is experiencing over the North Atlantic; a sinking ship's radioman frantically calling for help as the Coast Guard gears up for a rescue operation; NASA ground and air support crews anxiously coordinating their observations as the Space Shuttle thunders into a blue Florida sky; the strained voices of Navy personnel cautiously navigating the treacherous Persian Gulf.

Many listeners enjoy tuning in ham radio operators as they describe their equipment and discuss a wide variety of technical issues. Specialty nets (networks) can be heard assisting craft at sea, providing weather alert information, passing personal messages between military personnel and their families back home or reassuring relatives of disaster victims in distant lands.

The HF (high frequency or "shortwave") portion of the spectrum, a swath of frequencies beginning just above the top end of the AM medium wave broadcast band (1.7 MHz) and extending to just above the CB and amateur ten meter band (30 MHz), is the mast signal-saturated chunk of the radio spectrum.

The variety of signals which can be heard here is almost endless: radioteletype, facsimile, single sideband, amplitude modulation, frequency modulation, slow-scan television, propagational beacons, telemetry, pulse signals, independent sideband, multiplex, continuous wave (Morse code), ionosonde bursts, packet and ASCII data, and more.

And the users? You name them -- they'll probably be found here. Drug smugglers have taken to the airwaves to coordinate shipments of illicit cargo from Central and South America to the United States; on nearby frequencies the U.S. Coast Guard and Drug Enforcement Agency (DEA) will be in hot pursuit.

One listener reported hearing shouts from a drug runner as machine gun fire punctuated his last transmission. When the vessel Achille Lauro was hijacked, utilities listeners heard the negotiations -- and preparations for rescue -- over the air.

As President Reagan was rushed to the hospital suffering from the gunshot wound from a would-be assassin's bullet, an HF communications link was immediately established between the White House and Air Force One for Vice President Bush to assume a leadership role. Listeners monitoring that link knew the President's condition nearly an hour before the news was broadcast over the networks!

During the ill-fated Reykjavik summit conference, as Air Force One was again in flight back to the United States, it was the "ute DXer" who had the news first -- by

listening to the press corps relaying their information via HF radio back to the United States.

But the shortwave spectrum is an enormous range to tune blindly. Where does a prospective utility listener find the right information? Certainly, experience helps, but you have to start somewhere; fortunately, there are some excellent sources of this vital information.

The *Shortwave Directory* is a leading source of accurate information. Concentrating primarily on U.S. (but with worldwide entries as well), the *Shortwave Directory* includes listings for military, government, aircraft, space programs, maritime, public safety, scientific, private radio systems, common carriers, and broadcasting.

Many listings are very unusual such as terrorist networks, freebanders, spy numbers stations, hurricane networks, petroleum platform helicopters and emergency nets.

But to keep up with daily changes in the dynamic radio spectrum, the serious listener needs a reliable monthly magazine like *Monitoring Times*, the first and largest magazine to cover all aspects of radio communications and broadcasting from the lowest frequencies, through shortwave and scanners, and on to satellites.

A subscription to this leading magazine is only $18 a year (U.S.) and you can request a sample by sending $2.00 to *Monitoring Times*, PO Box 98, Brasstown, NC 28902.

While every attempt has been made to ensure accuracy, some errors are inevitable and schedules do change. Corrections and additions from our readers are encouraged and appreciated.

In general, frequencies are listed in kilohertz (kHz), center carrier. In some cases upper or lower sideband offsets may be shown; these usually amount to 1.5 kHz displacement (1.4 kHz in maritime), and 1.2-2 kHz for facsimile and radioteletype.

Except for radio amateurs, virtually all voice transmissions in the HF spectrum will be in upper sideband (USB). Frequencies which are underlined are most commonly reported in use.

Yes, the HF spectrum radiates an incredible variety of entertainment and intrigue for every listening taste, and it is all at your fingertips when you know how and where to listen. Next time a newbreaking story of international importance is developing, meet me on shortwave -- I'll be listening!

Communications Act of 1934

In order to preserve the privacy of communications, this regulatory section directs U.S. listeners who intercept communications not intended for their listening.

Section 705 has been generally interpreted to mean that a person who listens in to a radio message not intended for him may not reveal the contents of the message to a third party, nor may he use those contents for his own personal gain.

Section 501 of the Penal Code is invoked for serious infractions, enforced by the Federal Bureau of Investigation.

Prosecutions have been effected against individuals who have violated the provisions and sold the information or services to unauthorized persons.

So far as we know, no arrest has ever been made of an American hobbyist listening to shortwave for his own entertainment.

Federal Communications Act of 1934, as Amended

(Enforced by the Federal Bureau of Investigation)

SECTION 705A. No person receiving or assisting in receiving, or transmitting, or assisting in transmitting, any interstate or foreign communication by wire or radio shall divulge or publish the existence, contents, substance, purport, effect, or meaning thereof, except through authorized channels of transmission or reception, to any person other than the addressee, his agent, or attorney, or to a person employed or authorized to forward such communication to its destination, or to proper accounting or distributing officers of the various communicating centers over which the communication may be passed, or to the master of a ship under whom he is serving, or in response to a subpoena issued by a court of competent jurisdiction, or on demand of other lawful authority; and no person not being authorized by the sender shall intercept any communication and divulge or publish the existence, contents, substance, purport, effect, or meaning of such intercepted communication to any person; and no person not being entitled thereto shall receive or assist in receiving any interstate or foreign communication by wire or radio and use the same or any information therein contained for his own benefit or for the benefit of another not entitled thereto; and no person having received such intercepted communication or having become acquainted with the contents, substance, purport, effect, or meaning of the same or any part thereof, knowing that such information was so obtained, shall divulge or publish the existence, contents, substance, purport, effect, or meaning of the same or any part thereof, or use the same or any information therein contained for his own benefit or for the benefit of another not entitled thereto: PROVIDED, that this section shall not apply to the receiving, divulging, publishing, or utilizing the contents of any radio communication broadcast, or transmission by amateurs or others for the use of the general public, or relating to ships in distress.

The Electronic Communications Privacy Act of 1986 (ECPA)

In an effort to legislate privacy for mobile telephone users, as well as safeguard against government surveillance abuse, the U.S. Senate ratified and the President signed into law this controversial bill, effective January 19, 1987.

Providing strict penalties including stiff fines and imprisonment for violators, the Act is primarily of interest to scanner owners rather than shortwave listeners.

ECPA Protected Transmissions

Encryped, scrambled or other privacy techniques
Paid-subscription Subsidiary Carrier Authorization (SCA)
Voice/data Radio Common Carrier (mobile telephone, paging)
Remote broadcast pickup; studio to transmitter links
Private microwave systems

Communications Legal to Monitor

Federal, state or local government
Military
Police, fire, medical, civil defense
Private land mobile services
Marine and aeronautical
Amateur and CB
Cordless telephones
Tone-only paging
Broadcasting
Any transmission readily accessible to the general public

Many of the provisions may appear ambiguous; court test cases will be required to resolve them.

The Top 100 Shortwave Frequencies

Nowhere in the radio spectrum is there as much intrigue and fascination to be found as in the 2-30 MHz spectrum. The following list of recent loggings includes some of the most active frequencies (in kHz). The voice utilities (two-way communicators) are virtually all upper sideband (USB), while the broadcasters run full carrier amplitude modulation (AM). Since most listening is done in the evening hours, this representative sampling reflects that time.

UTILITIES

2670	U.S. Coast Guard
4063	Mississippi River barges
4069.2	Ship working channel
4087.8	Mississippi River barges
4112.6	Ship calling channel
4125	Ship calling channel
4143.6	Mississippi River barges
4413.4	Ship working channel
4419.4	Ship working channel
4467.5	Civil Air Patrol
4517	Air Force MARS
4593.5	Air Force MARS
4637.5	Offshore petroleum
4670	"Spy numbers" broadcasts
4742	"Spy numbers" broadcasts
5015	Army Corp of Engineers
5320	U.S. Coast Guard
5598	International airlines
5616	International airlines
5680	U.S. Coast Guard
5692	U.S. Coast Guard air/ground
5696	U.S. Coast Guard air/ground
5703	Tactical Air Command
5812	"Spy numbers" broadcasts
6506.4	U.S. Coast Guard ships
6518.8	Inland waterways
6521.9	Mississippi River barges
6577	International airlines
6586	International airlines
6604	Flight weather
6673	NOAA hurricane hunters
6683	Andrews AFB, VIP
6697	U.S. Navy
6705	U.S. Air Force air/ground
6723	U.S. Navy
6738	U.S. Air Force air/ground
6753	Canadian Air Force
6761	Strategic Air Command
6802	"Spy numbers" broadcast
6927	Andrews AFB, VIP
8291.1	Ship to shore, Pacific
8418	"Spy numbers" broadcast
8740.6	Ship to shore
8778	U.S. Navy
8784	Ship to shore, Pacific
8805.7	Ship to shore
8808.8	Ship to shore
8825	International airlines
8846	International airlines
8879	International airlines
8891	International airlines
8921	International airlines
8972	U.S. Navy, Atlantic
8984	U.S. Coast Guard, air/ground
8989	U.S. Air Force, air/ground
8993	U.S. Air Force, air/ground
9014	U.S. Air Force, air/ground
9027	U.S. Air Force, air/ground
10493	FEMA, emergency net
10780	NASA air/ground
11176	U.S. Air Force, air/ground
11182	Scott Air Force Base, air/gnd
11200	RAF, flight weather
11233	Canadian Air Force air/ground
11234	RAF, air ground
11243	Strategic Air Command
11246	U.S. Air Force, air/ground
11282	International airlines
11538	U.S. Navy, Mars
12429.2	Ship to shore
13113.2	U.S. Coast Guard marine weather
13181	U.S. Navy
13201	U.S. Air Force air/ground
13215	U.S. Air Force air/ground
13241	U.S. Air Force air/ground
13270	Flying weather
13282	Flight weather
13306	International airlines
13354	NOAA, hurricane hunters

The Hottest Shortwave Frequencies for Two-Way Voice Intrigue

2180-2900	8700-9050
4300-4750	11175-11400
5300-5900	13200-13340
6600-6900	15010-15100
7500-8000	

INTERNATIONAL BROADCASTERS

(Schedules subject to change)

5960	Canada	9630	Spain
6030	American Forces Radio/TV	9655	Cuba
6085	Germany	9755	Canada
6175	England	9875	Ecuador
7165	USSR	11775	Ecuador
7325	England	11880	Spain
7355	USA	15345	American Forces Radio/TV
9435	Israel	17795	Australia

Time Signals

WWV	CHU
5000	3330
10000	7335
15000	14670

United States

Air Force Bases in the United States

Gunter	Alabama
Maxwell	Alabama
Davis-Monthan	Arizona
Luke	Arizona
Williams	Arizona
Blytheville[1]	Arkansas
Little Rock[1]	Arkansas
Beale[1]	California
Castle[1]	California
Edwards	California
George	California
March[1]	California
Mather[1]	California
McClellan	California
Norton	California
Travis[1]	California
Vandenberg[1]	California
Colorado Springs[2]	Colorado
Lowry	Colorado
Peterson	Colorado
Dover	Delaware
Bolling	D.C.
Eglin	Florida
Homestead	Florida
Hurburt Fld	Florida
MacDill	Florida
Patrick	Florida
Tyndall	Florida
Dobbins[3]	Georgia
Moody	Georgia
Robins[1]	Georgia
Mt. Home	Idaho
Chanute	Illinois
Chicago O'Hare IAP[3]	Illinois
Scott	Illinois
Grissom[1]	Indiana
McConnell[1]	Kansas
Barksdale[1]	Louisiana
England	Louisiana
New Orleans NAS[3]	Louisiana
Loring[1]	Maine
Andrews	Maryland
Hanscom	Massachusetts
Westover[3,1?]	Massachusetts
KI Sawyer[1]	Michigan
Selfridge	Michigan
Wurtsmith[1]	Michigan
Minneapolis-St Paul[3]	Minnesota
Columbus	Mississippi
Keesler	Mississippi
Richard-Gebaur[3]	Missouri
Whiteman[1]	Missouri
Malmstrom[1]	Montana
Offutt[1]	Nebraska
Nellis	Nevada
Pease[1]	New Hampshire
Mcguire	New Jersey
Cannon	New Mexico
Holloman	New Mexico
Kirtland	New Mexico
Griffiss[1]	New York
Niagara Falls IAP[3]	New York
Plattsburgh[1]	New York
Pope	North Carolina
Seymour Johnson[1]	North Carolina
Grand Forks[1]	North Dakota
Minot[1]	North Dakota
Rickenbacker	Ohio
Wright Patterson	Ohio
Youngstown Municipal[3]	Ohio
Altus[1]	Oklahoma
Tinker	Oklahoma
Vance	Oklahoma
Portland IAP	Oregon
Gtr Pittsburgh[3]	Pennsylvania
Willow Grove NAS[3]	Pennsylvania
Charleston	South Carolina
Myrtle Beach	South Carolina
Shaw	South Carolina
Ellsworth[1]	South Dakota
Bergstrom	Texas
Brooks	Texas
Carswell[1]	Texas
Dyess[1]	Texas
Goodfellow	Texas
Kelly	Texas
Lackland	Texas
Laughlin	Texas
Randolph	Texas
Reese	Texas
Sheppard	Texas
Hill	Utah
Langley	Virginia
Fairchild[1]	Washington
McChord	Washington
Gen.Mitchell Field[3]	Wisconsin
F.E.Warren[1]	Wyoming

(1) SAC (2) US Air Force Academy
(3) AFRES Base

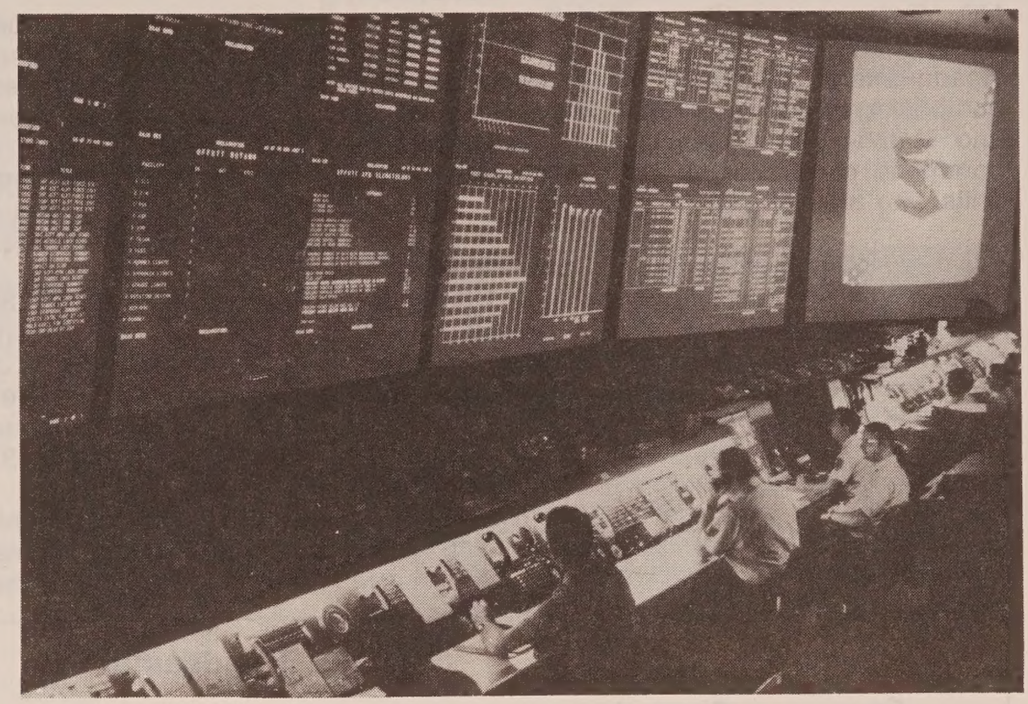
AIR FORCE

The "battle staff" section of a Looking Glass *during an actual mission. In the foreground is the Commander-in-Chief of SAC, General Bennie L. Davis, acting as Emergency Action Officer. Every SAC general officer must fly* Looking Glass *on a regular schedule (SAC photo).*

United Stations Air Force Installations Outside CONUS

AB = Air Base (major installation)
AS = Air Station (support base)
AFS = Air Force Station (radar)

Albrook AFS	Panama
Andersen AFB	Guam
Ankara AS	Turkey
Ascension AB	Ascension Is.
Aviano AB	Italy
Bellows AFS	Hawaii
Bitburg AB	FRG
Camp New Amsterdam	Netherlands
Clark AFB	Philippines
Clear AFS	Alaska
Comiso AS	Italy
Eielson AFB	Alaska
Elmendorf AFB	Alaska
Florennes AB	Belgium
Fylingdales Moor AFS	UK
Galena Airport	Alaska
Hahn AB	FRG
Hellenikon AB	Greece
Hessisch-Oldendorf AB	FRG
Hickam AFB	Hawaii
Howard AFB	Panama
Incirlik AB	Turkey
Iraklion AS	Crete
Izmir AS	Turkey
John Hay AS	Philippines
Kadena AB	Okinawa, Japan
Keflavik NAS	Iceland
King Salmon Airport	Alaska
Kunsan AB	KOR
Kwangju AB	KOR
Lajes Field	Azores
Lindsey AS	FRG
Misawa AB	Japan
Osan AB	KOR
Pirinclik AFS	Turkey



The Underground Command Post showing part of the control consoles and the 16x16 foot projection screens. The command post is manned by a battle staff 24 hours a day (SAC photo).

RAF Alconbury	UK
RAF Brentwaters	UK
RAF Chicksands	UK
(RAF Croughton	UK)
RAF Fairford	UK
RAF Greenham Common	UK
RAF Lakenheath	UK
RAF Mildenhall	UK
RAF Upper Heyford	UK
RAF Woodbridge	UK
Ramstein AB	FRG
Rhein-Main AB	FRG
San Miguel AFS	Philippines
San Vito AS	Italy
Sembach AB	FRG
Shemya AFB	Alaska
Sondrestrom AB	Greenland
Spangdahlem AB	FRG
Suwon AB	KOR
Taegu AB	KOR
Tempelhof Central Airport	W Berlin FRG
Thule AB	Greenland
Torrejon AB	Spain
Wallace AS	Philippines
Wheeler AFB	Hawaii
Yokota AB	Japan
Zaragoza AB	Spain
Zweibrucken AB	FRG

Note: There are many others, usually shared with US Army/US Navy of a logistical support nature.

USAF Strategic Air Command

Fully 30% of SAC aircraft are on alert status at all times. This effort requires considerable coordination between aircraft, ground stations and nuclear missile silos. As part of the H.F. failsafe system ("Giant Talk")ble coordination between aircraft, ground stations and nuclear missile silos. As part of the H.F. failsafe system ("Giant Talk"), routine Foxtrot ("Skyking") mission status broadcasts are made throughout each hour ("alpha monitor" periods). Should the United States be involved in armed conflict, the go-code would be transmitted via this network (as well as others).

Primary "Skyking" channels are underlined. Nine transmitter sites maintain the net: Andrews, Clark, Croughton, Elmendorf, Incirlik, McClellan, Offutt, Thule and Yokota. Andrews, Offutt and McClellan

are control stations. Andrews transmits from Davidsonville, MD, and receives at Brandywine, MD. Emission is USB.

Headquartered at Offutt AFB, Nebraska, and comprising the forces of Barksdale AFB, Louisiana, and March AFB, California, SAC can also take command of 20 reserve and Air National Guard units with their 15,800 members.

On a worldwide basis, SAC involves more than 120,000 military and civilian personnel operating on 26 air bases and with tenant privileges on 47 more. Western Pacific operations are conducted from Anderson AFB, Guam, and in Europe from Ramstein AB, Germany.

The tones which accompany voice transmissions key up remote terrestrial and satellite circuits. Occasionally, two tones will be heard keying up two locations; an "echo" effect will often be heard as a result.

Sample EAM: "Quebec Tango four five zero, standby; Quebec Tango four five zero, standby, message follows (series of letters and numbers); I say again (series repeated). This is Sandwich; out". QT450 is the message identifier; it is repeated to give the aircrew time to prepare to copy the message. If they had copied that message previously, they ignore it.

Another format is "Skyking, Skyking, do not answer; Oscar, Charlie, Golf, time 53, authentication Sierra Juliett; I say again (etc.)" These are the go-code or cancellation messages for nuclear strike. If they are repeated three times, monitor 6761 or 11243.

Skyking broadcasts are frequently heard on U.S. Navy frequencies as well (6697, 11267, others) as they are recorded by the Navy for playback on their

Skyking Broadcasts

Freq	Channel	Usage
3113	(varies)	Airborne Command Post Intercommunication
3292	(varies)	
3295	ALPHA MIKE	
3369	ALPHA SIERRA	
4373	ZULU ZULU	
4492	(varies)	
4495	ECHO	Airborne Command Post Intercommunication
4725	VICTOR	Primary Air-to-ground/refuel
4896	(varies)	
5020	FOXTROT	Airborne Command Post Intercommunication
5026	FOXTROT (alt.)	Airborne Command Post Intercommunication
5110	(varies)	
5171	(varies)	
5215	(varies)	
5243		Airborne Command Post Intercommunication
5328	(varies)	
5684	FOXTROT QUEBEC	
5700	BRAVO QUEBEC	Airborne Command Post Intercommunication
5826	BRAVO UNIFORM	Airborne Command Post Intercommunication
6680	FOXTROT XRAY	
6712	(varies)	Also Alpha Two in PACAF
6761	QUEBEC	Primary Night Air-to-ground Channel
6826	GOLF	
6840		
6863	OSCAR	
6870	KILO	Airborne Command Post Intercommunication
6886		
7330	YANKEE and XRAY	
7983	FOXTROT CHARLIE	
8101	ALPHA PAPA	Airborne Command Post Intercommunication
9023		SAC/NORAD Intercommunications/AWACS
9027	ROMEO	Primary Air-to-ground Channel
9057	PAPA	Airborne Command Post Intercommunication
9220	(varies)	
9234	(varies)	
10452	OSCAR	PACAF Designator
10510		Possible PACAF Channel

frequencies.

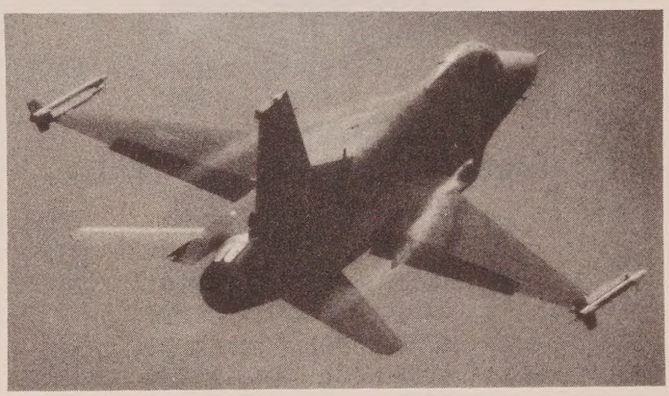
SAC Pacific

10344
12129
15734

Emergency Action Messages
(*"Skyking"* Broadcasts)

Skyking broadcasts are made every 60 minutes via encoded high-priority SSB voice. Additionally, "CAPSULE" transmissions periodically update operational instructions to MAC aircraft.

STATION	EAM	CAPSULE
Albrook	unlisted	H+25,+55
Andersen	H+23	H+20,+50
Ascension	unlisted	H+15,+45
Clark	H+53	H+25,+55
Croughton	H+08	H+00,+30
Elmendorf	H+43	H+15,+45
Hickam	H+33	H+00,+30
Loring	H+48	
Incirlik	H+18	H+10,+40
Lajes	H+38	H+05,+35
Loring	H+48	
MacDill	H+58	H+20,+50
McClellan	H+13	H+10,+40
Scott	unlisted	upon receipt
Thule	H+28	H+15,+45
Yokota	H+03	H+05,+35



11100	ALPHA 21	Airborne Command Post Intercommunication
11118		
11220	BRAVO	Primary Day Air-to-ground Channel
11243	ALPHA ONE	Data Channel
11408	YANKEE QUEBEC	Training Frequency-Practice Messages
11494	LIMA	
11607	ALPHA ZULU	SAC Special Operations Channel
13205	ALPHA XRAY	Airborne Command Post Intercommunication
13211	BRAVO WHISKEY	Primary Air-to-ground Channel
13241	SIERRA	
13547	(varies)	
13907	ALPHA CHARLIE	
14716	SIERRA ECHO	
14744	ALPHA TANGO	
14775	(varies)	"Mike" in PACAF
14955	CHARLIE	
15035	CHARLIE QUEBEC	Shared with Canadian forces
10541	MIKE	Primary Air-to-ground Channel
15091	BRAVO XRAY	TAC-to-SAC Intercommunication
15544		Possible SAC Point-to-point Channel
15962	INDIA	
17617	BRAVO HOTEL	
17975	TANGO	Primary Air-to-ground Channel
18005	TANGO	PACAF Designator
18046	JULIETTE	
18594	ZULU ONE	
20631	WHISKEY	Primary Air-to-ground Channel
20737		Possible PACAF Channel
20740	LIMA	PACAF Designator
20846	CHARLIE ALPHA	SAC-to-CAP Intercommunication
20890	DELTA	
21815	FOXTROT SIERRA	
23337	UNIFORM	
23419		Possible SAC-NORAD Intercommunication
27870	DELTA QUEBEC	

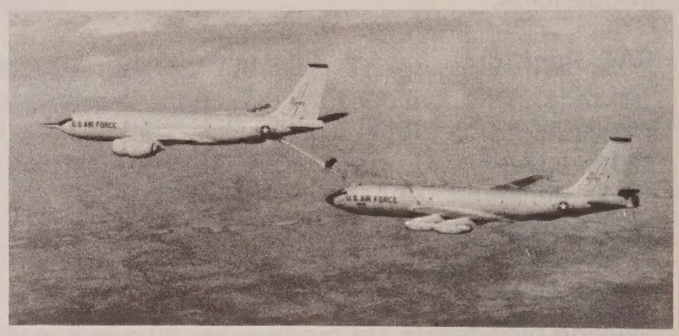
U.S. Air Force
Tactical Air Command (TAC)

(All frequencies USB)

3032	8964
3060	9014
4449	11214
4742	13204
5703	15091
6730	18019
6753	23206

TAC Ground Stations

Callsign	Location
Fireside One	TAC HQ, Langley AFB, VA
Fireside Two	(Not in use)
Fireside Three	9th AF HQ, 3630 TFW, Shaw AFB, SC
Fireside Four	Mountain Home AFB, ID
Fireside Five	12th AF HQ, Bergstrom AFB, TX
Raymond	TAC Command Posts
Raymond 1	HQ TAC, ALCC Langley AFB, VA
Raymond 6	George AFB, CA
Raymond 7	27th & 35th TFW, Cannon AFB, NM
Raymond 8	Davis-Monthan AFB, Tucson, AZ
Raymond 9	Dyess AFB, TX
Raymond 10	1st SOW, Hurlburt Field, FL
Raymond 11	Eglin AFB, FL
Raymond 12	England AFB, LA
Raymond 13	Homestead AFB, FL
Raymond 14	49th TFW, Holloman AFB, NM
Raymond 15	31st TFW, Homestead AFB, FL
Raymond 16	1st TFW, 316th Unit, Langley, VA
Raymond 17	347th TFW, Moody AFB, GA
Raymond 18	Luke AFB, Phoenix, AZ
Raymond 19	56th TFW, MacDill AFB, FL
Raymond 20	Patrick AFB, Cape Canaveral, FL
Raymond 21	345th TFW, Myrtle Beach AFB, SC
Raymond 22	57th & 474th TFW, Nellis AFB, NV
Raymond 23	Pope AFB, NC
Raymond 24	552nd AWACS, Tinker AFB, OK



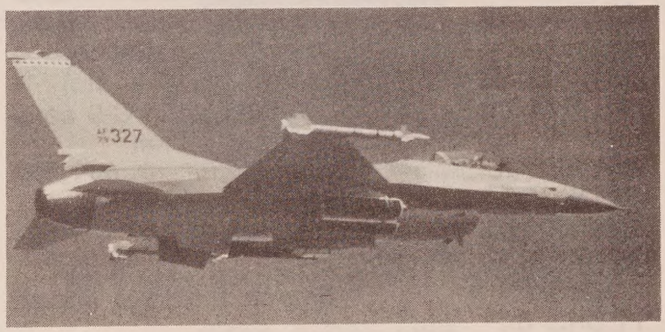
Raymond 25	4th TFW, Seymour Johnson AFB, NC
Raymond 26	363rd TFW, Shaw AFB, SC
Raymond 27	366th TFW & 662 TACW, Mountain Home AFB, ID
Raymond 28	Bergstrom AFB, TX

U.S. Air Force
Global Command & Control System (GCCS) Stations-AFCC/ATOS

Formerly known as the Airways Stations and In-Flight Stations, these stations are now used for command and control of U.S. military operations. Regular ATC and position reporting now take place on commercial ATC frequencies. Most transmissions will be USB; LSB usually denotes VIP flight. Hours of operation are shown where applicable.

3067	Croughton,UK (2300-0500)
3081	Lajes,Azores(2100-1000)
3144	Hickam,HI(0600-1700)
4721	Andrews,MD(2400-1200)
4746	Lajes,Azores(2100-1000) MacDill,FL(0001-0900) McClellan,CA(0400-1600)
4747	Yokota,J (1000-2100)
5688	Loring,ME(0900-2400) MacDill,FL(0001-0900)
5703	Croughton,Eng(2100-0800)
5710	Albrook,PNZ(0200-1200) Elmendorf,AK

	Thule,GRL
	Yokota,Japan
6683	Albrook(0001-1400)
6727	Scott,IL(0200-1400)
6730	Albrook, PNZ
6738	Andersen,Guam(0700-2200)
	Clark,PHIL(1200-2200)
	Elmendorf,AK
	Hickam,HI(0400-1900)
	McClellan,CA(0400-1600)
	Incirlik,Turkey
	Thule,GRL
	Yokota(0900-2400)
6750	Croughton,Eng
	Lajes,Azores
	MacDill,FL(0001-0900)
6753	Ascension(2000-0800)
6756	Andrews,MD
6757	Croughton,Eng
8964	Hickam,HI
8967	Andersen,Guam
	Hickam,HI
	Lajes,Azores
	Thule,GRL
	Yokota,Japan
8989	Elmendorf,AK
	Loring,ME
	MacDill,FL
	McClellan,CA
8993	Albrook,PNZ
	Ascension Is
	Clark,Phillipines
	MacDill,FL
9011	Croughton(0500-2300)
9014	Loring,ME(0900-2400)
	Scott,IL
9018	Andrews,MD
11176	Andersen,Guam
	Clark,Phil(1500-0200)
	Ascension(1800-1000)
	Croughton,Eng
	Diego Garcia(USN)(1500-0200)
	Elmendorf
	Incirlik,Turkey
11179	Hickam,HI
	Loring,ME(0100-0900)
	MacDill,FL(0900-2400)
11182	Scott,IL (H24)
11226	Elmendorf,AK
	Lajes,Azores(1000-2100)
11228	Thule,GRL
11236	Yokota,Japan
11239	McClellan,CA
11246	MacDill,FL
13201	Andersen,Guam
	Clark,Phil
	Elmendorf,AK
	Hickam,HI(1700-0600)
	Thule,GRL
	Yokota,J(2100-1000)
13214	Incirlik, Turkey
	Croughton, Eng(0800-2100)
13215	Hickam,HI
	Andersen, Guam
	Lajes, Azores
	Yokota, J
13244	Ascension(1000-1800)
	Lajes,Azores(1000-2100)
	MacDill,FL(0900-2400)
13247	Andrews,MD(1200-2400)
15014	Incirlik, Turkey
15015	Albrook,PNZ(1200-0200)
	Ascension(0800-2000)
	Scott,IL(1400-0200)
15031	McClellan,CA(1600-0400)
15036	Croughton,Eng
18002	Andersen,Guam(2200-0700)
	Clark,Phil(2200-1200)
	Hickam,HI(1900-0400)
	Loring,ME(0100-0900)
	McClellan,CA(1600-0400)
	Yokota,J(0001-0900)
18019	Albrook,PNZ(1400-2400)
	MacDill,FL(0900-2400)
23227	Clark,Phil(0200-1300)
	Diego Garcia,CA(USN)



U.S. Air Force
In-Flight Callsigns (DV Code)

AIR FORCE 1	US President (USAF #27000)
AIR FORCE 2	US Vice President (USAF #31682)
EXECUTIVE 1	US President aboard non-military aircraft
EXECUTIVE 2	US Vice President aboard non-military aircraft
EXECUTIVE 1 or 2 FOXTROT	US Presidential or Vice Presidential family member aboard any

AIR FORCE

Air Force One

	aircraft
AFKAI 01-99	Tactical ops
AFKAI (Word) 01-99	Non-tactical courier or tactical airlift SAM, 89 MAW
SAM/5 digits	Special Air Mission (VIP/Diplomatic flight) (SAM86971 Secretary of State) (SAM86972 National Security Advisor)
SAM 01	Heads of state of foreign countries
VENUS	SAM aircraft without VIP aboard
MAC/tail #	Military Airlift Command
SPAR/01-99	Other Special Air Mission (diplomatic, attache, MAAG, 89MAW, etc)
AIR EVAC/tail #	Air evacuation C-9 aero-medical aircraft
AIR RESCUE/tail #	SAR aircraft on mission
MEDEVAC	Hospital aircraft
COPTER/tail #	Helicopter
AIR FORCE RESCUE/ tail #	Search & rescue aircraft
PEDRO or SAVE/01-99	USN/USMC rescue craft not on rescue mission
3-letter word/3 d.	Undergraduate pilot training
6-letter word/1 d.	TAC combat crew training
3-letter word/4 d.	MAC/TAC civil disturbance airlift
6-15 letter word(s)	SAC ground station
3-5 letter word/2 d.	SAC bomber or tanker
US AIR FORCE	Foreign over-flights
6-15 letter word(s)	SAC ground station
3-5 letter word/2 d.	SAC bomber or tanker

USAF Tactical Callsigns and Code Words

ACROBAT	Andrews Air Force Base
AFKAI	97th MAW flight
ALLIGATOR	AWACS SECOM (See abbreviations)
ARMY 1	US Army Helicopter, President on board
ARMY 2	US Army Helicopter, Vice President on board
BENT SPEAR	Significant nuclear accident
BIG FOOT	McCord AFB, WA
BROKEN ARROW	Damaged nuclear weapon; emergency 2000 foot perimeter
CAPSULE	General call sign for all MAC aircraft
COVERED WAGON	Confirmed hostile act
CROWN	White House communications agency (WHCA)
DENALI	Alaskan ALCC (MAC) center at Elmendorf AFB
DETONE	(See SENTRY)
DISCARD	22nd Air Force Operations Center (MAC Travis AFB, CA)
DRAGNET	(See SENTRY)
DROPKICK	SAC HQ, Offutt AFB, NE
DULL SWORD	Nuclear incident
EDGY	AWACS Aircraft, Training flight from Tinker AFB, OK
ELECTRIC	NEACP (National Emergency Airborne Command Post)
FADED GIANT	Radiological incident or accident
FAST CHARGER	Air Force Joint Command, Europe
FERTILE	SAGE/NORAD net center (Ft. Lee, VA)
FLYNEST	Nuclear-CBW emergency disaster team
FORMAT	21st AF (MAC McGuire AFB, NJ)
FURIOUS	S. American ALCC (MAC, Albrook AFB)
GOLD COIN	MacDill AFB, FL, Strike Command Control
GOLDEN	General call from TAC aircraft to ground station
GOLIATH	NORAD, Duluth (MN) International Airport
GULL	53rd WRS Keesler AFB, MS
HELPING HAND	Threat of hostile act

HILDA	MAC Operations Center, Scott AFB, IL
JOLLY 01-99	SAR helicopter (HH3/ HH53) not on mission
KING 01-99	SAR aircraft (HC-130) not on mission
LARK	55th WRS McClellan AFB, CA (RC-135/WC-135 aircraft)
LETTERMAN	Hickam AFB, HI, weather forecasts
MAINSAIL	General call to any command control station
MARINE 1	USMC Helicopter, President on board
MARINE 2	USMC Helicopter, Vice President on board
MINUTEMAN	Andrews AFB ANG
NIGHT HAWK	Presidential helicopters (Marine Corps)
NO-LONE ZONE	Lone individuals prohibited (nuclear weapons area)
PHANTOM	European theater airlift control
QUEEN	Rescue Operations Ctr, Eglin AFB ARRS
SAFE WIND	Emergency security order from higher command
SENTRY	AWACS aircraft (E3A) from Tinker AFB (OK), NCS Raymond 24
SKYBIRD	General call to any SAC ground station
SKYKING	General call to any SAC SIOP forces aircraft
SPAR	89th MAW VIP flight
SWAN	54th WRS Andersen AFB, Guam (WC-130 aircraft)
TEAL	815th WRS Keesler AFB, MS (WC-130 aircraft)
TONIGHT	MAC - Pacific Airlift Control Center
TRICE	911th TAC Airlift Group, Pittsburgh, PA

U.S. Air Force Miscellaneous USB

6780	Andrews AFB
6812	Andrews AFB
7840	Andrews AFB
13207	Palmerana AFB, Honduras

U.S. Air Force Commando Escort Net
(Hawaii)

Callsigns: American Eagle, Fivespot, Fletcher
Frequencies: 10452 10510 20737 26515

U.S. Air Force Pacific Point to Point

6712	USB	"Alpha 2"
10452	USB	"Oscar"
14775	LSB	"Mike"
18005	USB	"Tango"
20740	USB	"Lima"

U.S. Air Force Atlantic Practice Range

Communications may be heard from fighter aircraft as they duel with a string of eight towers 50 miles off the U.S. east coast (approximate coordinates: 21°N/80°W) on a frequency of 4295 kHz (USB). Tactical call - "Sea Tac."

U.S. Air Force Military Airlift Command (MAC)

5197 18027 USB

U.S. Military Advisory Group (MAG)
U.S. Office of Defense Cooperation Mission Radio Network

The U.S. Air Force operations a single sideband communications network to provide logistic and morale phone patches among the military attaches located at U.S. Embassies in South & Central America. The network control station is at Howard AFB, Republic of Panama.

Stations identify with the last letter and numerals of call sign; for instance, AHF4 identifies as "Fox 4".

AHF1B has been heard airborne.

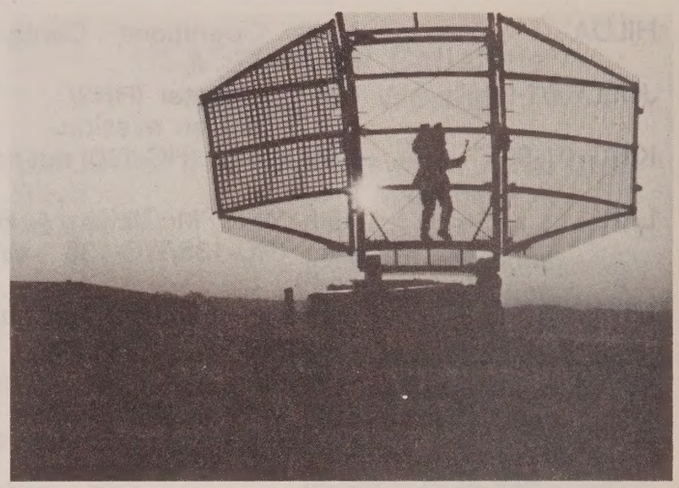
3503	Ch 1
7430	Ch 2 Night Pri
10935	Ch 3
13937	Command
13950	Ch 4 Day Pri
20885	Ch 1 Day Sec

AHF4	Howard AFB, Panama
LQU21	Buenos Aires, Argentina
VPL1D5	Belize City, Belize
CPP67	La Paz, Bolivia
CEF5U1	Santiago, Chile
5K0225	Bogota, Colombia
ACB	Rio de Janeiro, Brazil
TI2USA	San Jose, Costa Rica
HIP491	Santo Domingo, Dominican Republic
HCUS1	Quito, Ecuador
YS1HUKE	San Salvador, El Salvador
TDMG3	Guatemala City, Guatemala
ACH54	Port Au Prince, Haiti
HR1MM	Tegucigalpa, Honduras
YN1AFM	Managua, Nicaragua
ZPM261	Asuncion, Paraguay
OAE21	Lima, Peru
CXC20	Montevideo, Uruguay
YWA6	Caracas, Venezuela
AHF1B	Unidentified
AHF1A	Unidentified, possibly El Salvador
AHF5	Unidentified
TGHM1	Unidentified

North American Aerospace Defense Command (NORAD)

Secured nearly a mile beneath Cheyenne Mountain near Colorado Springs is the "war room," home of NORAD. Intelligence from satellites, radar, surveillance aircraft and other sources is gathered continuously.

Encharged with the responsibility to detect the intrusion of hostile aircraft, NORAD is staffed by Air



Force and Army personnel. Other transmitters are located at North Bend, OR and Hamilton, CA.

USB radio checks are made approximately on the hour; callsigns change often, with "Ringmaster" reportedly used at NORAD HQ.

5297	11441
9023	14894
9793	20855

Aerospace Rescue and Recovery Service (ARRS)

Operating from Air Force bases worldwide, the ARRS provides emergency assistance to downed aircraft. During rescue exercises, ARRS aircraft will identify as "Air Force Rescue" followed by their tail numbers.

During non-rescue missions, C-130 aircraft will identify as "King," HH53 helicopters as "Jolly." The Rescue Operations Center at Eglin AFB, Florida, is "Queen."

6715	Homestead AFB, FL
11440	Eglin AFB, FL

Air National Guard Nationwide

4760	6714	7460
5703	6769	7853
5745	6800	8731
5805	6890	14650
5827	6895	17975
6100	6940	

U.S. Air Force Reserves

4457 4812

U.S. Air Force Security Service

2010 Medina, TX
26710 Kelly AFB, TX

U.S. Air Force Crash Investigation

4277

"Redstone": Communications teams
"Stardust": Commanders

U.S. Air Force (DATA-AUTODIN)

Frequencies: 10185 12201 13473 15620.5 19955
Callsign: AFA, Davidsonville, MD

U.S. Air Force Mulcast

(Multichannel broadcast)

A single wideband channel may be selected for several simultaneous transmissions of information. A typical example (10205 kHz) shows a channel breakdown as follows:

10118.8	USB voice
10205	LSB voice
10205.4-10208	16 RTTY channels (85 Hz shift, 85 Hz separation)
10211.3	LSB voice

AFA--Andrews Air Force Base, MD, Mulcast
7870 7922.5 10205 10315 14417.5 14646

CUW--Lajes AFB, Azores, Mulcast
9198 10305 13728 15757.5 19285 21767

AJE--(Croughton), England, Mulcast

5224 5246 5370.5 9236 10531.5 16035 16448

AJE--(Croughton) to CUW (Lajes) Mulcast

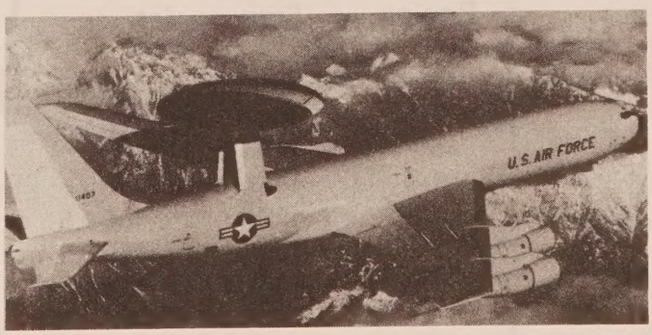
5224 5242.5 7567 9172.5 11682.5 14879.5 15575.5 16140 18226 23360

Mulcast includes 50 baud AP news, 45 baud UPI news, 75 baud weather (all USB) and LSB AFRTS voice (6.3 kHz above center frequency).

Ground Wave Emergency Network (GWEN)

As part of the Survivable Low Frequency Communications Systems (SLFCS), the Air Force is installing hundreds of transmitter and receiver sites in the 150-174 kHz range across the nation. Some frequencies support more than one transmitter. Channel spacing is 1.25 kHz and the mode is encrypted RTTY.

150.5	Plattsburgh, AFB, NY
153.0	SE Virginia
156.75	
159.25	Brandywine, MD
	Harrisburg, PA
160.5	Elmira, NY
163.75	Davidsonville, MD
	NW PA
165.75	Griffiss AFB, NY
170.5	Hagerstown, MD
171.75	W Central PA
173.0	Seymour Johnson AFB, NC



AIR FORCE

Civil Air Patrol (CAP)

A civilian search and rescue effort sponsored by the Air Force, CAP conducts training nets and rescue missions nationwide via shortwave radio. Aircraft, ships, mobile units and base stations communicate using tactical callsigns.

Tactical Net

Region	Headquarters Location	Callsign	Tactical Call
1)North East	Mineola, NY	KGC632	Northeast 10
2)Middle East	Shaw AFB, SC	KIL769	Middle East 4
3)Great Lakes	Wright Patterson AFB,OH	KSF248	Great Lakes 55
4)South East	Nashville, TN	KIJ960	Southeast 4
5)North Central	Minneapolis, MN	KAJ506	North Central 8
6)South West	Dallas, TX	KKQ266	Southwest 11
7)Rocky Mountain	Lowrey AFB, CO	KAI562	Rocky Mountains 28
8)Pacific	Hamilton AFB, CA	KMG664	Northwind 8
Net Control	Maxwell AFB, AL	KJ9885	Headcap22

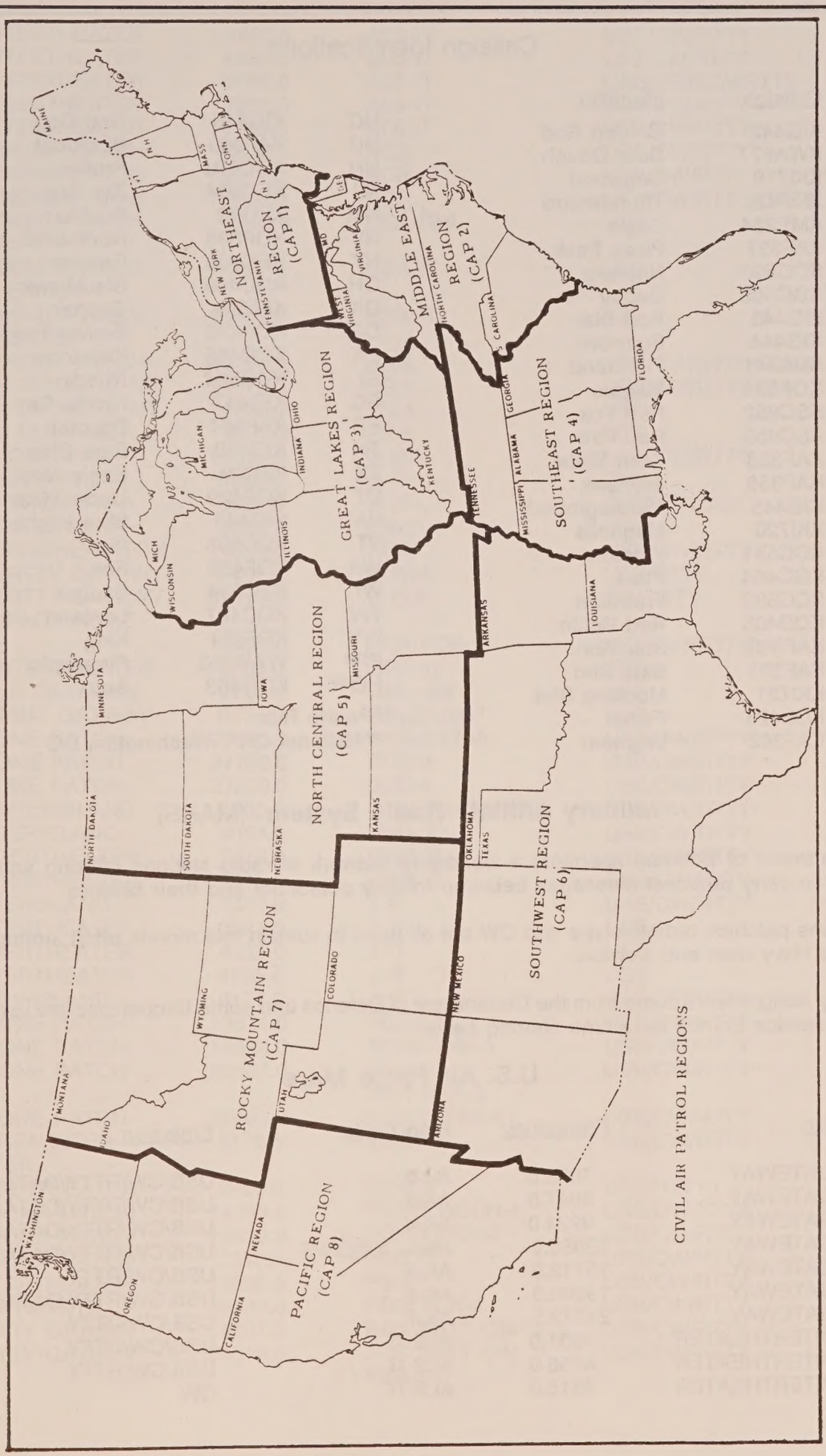
Frequencies and Regions
(USB/LSB)

Freq	Regions	Freq	Regions
2371	USA	4627	6
2374	USA	4630	6
4464.5	(1)	7635	1 3 4 5 (w/USAF)
4467.5	1 2 4		
4504.5	(8)	7918.5	1 2 3 5 6 7 8 (w/USAF)
4507.5	3 5		
4582	Emergency/ calling	14905	1 2 6 7 8 (w/USAF)
4585	2 PR	20873	4 PR
4599.5	(7)	26620	USA
4602.5	3		

Training Net Schedule
(daily, USB)

Region	Frequencies		Net Times		
3	4602.5	4507.5	0000-0230	1330-1600	2130-2400
2	4585	4467.5	0000-0200	1230-1600	2100-2400
5	4705.5	4585	0000-0400	1200-1600	1800-1830
1	4464.5	4585	0000-0230	1300-1700	2130-2400
8	4585	4504.5	0130-0630	1450-	2130-2400
7	4599.5	4602.5	0100-0400	1345-1530	1600-1800
4	4467.5	4585	0000-0230 2230-2400	1230-1400	1430-1500
6	4627	4630	0000-0400	1300-1430	2300-2400

Nationwide roll call 2230 UTC daily 7635 USB/14905 LSB


NORTHEAST REGION (CAP 1)
MIDDLE EAST REGION (CAP 2)
GREAT LAKES REGION (CAP 3)
SOUTHEAST REGION (CAP 4)
NORTH CENTRAL REGION (CAP 5)
SOUTHWEST REGION (CAP 6)
ROCKY MOUNTAIN REGION (CAP 7)
PACIFIC REGION (CAP 8)
CIVIL AIR PATROL REGIONS
MAINE
N.H.
MASS.
CONN.
N.J.
DEL.
MD.
NEW YORK
PENNSYLVANIA
WEST VIRGINIA
VIRGINIA
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
MICHIGAN
OHIO
INDIANA
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
WISCONSIN
ILLINOIS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MONTANA
WYOMING
COLORADO
NEW MEXICO
IDAHO
UTAH
ARIZONA
WASHINGTON
OREGON
NEVADA
CALIFORNIA

AIR FORCE

Callsign Identifications

State	Callsign	Identifier
AL	KIG442	Golden Rod
AK	KWA677	Sour Dough
AR	KKI719	Dogwood
AZ	KOF424	Thunderbird
CA	KME284	Eagle
CO	KAF357	Pikes Peak
CT	KCC590	Nutmeg
DE	KGC462	Gabby
GA	KIG443	Red Star
FL	KIG444	Sparrow
HI	KUA341	Firebrand
ID	KOP334	Magpie
IL	KSC952	Red Fox
IN	KSC953	Red Fire
IA	KAF358	Corn State
KS	KAF359	Jayhawk
KY	KIG445	Middleground
LA	KKI720	Magnolia
ME	KCC591	Pinetree
MD	KGC464	Plant
MA	KCC592	Freedom
MI	KQD405	Red Robin
MN	KAF360	Star Fish
MO	KAF361	Blue Bird
MS	KKI721	Mocking Bird
MT	KOF426	Father
NB	KAF362	Wigwam
NC	KIG446	Red Dog
ND	KAF363	Blackfoot
NH	KCC593	Profile
NJ	KEC994	Zig Zag
NM	KKI772	Pueblo
NV	KOP335	Northwind
NY	KEC995	Empire
OH	KQD406	Blackhawk
OK	KKI723	Sooner
OR	KOF428	Beaver Fox
PA	KCC465	Keystone
RI	KCC594	Rhody
SC	KIG447	Kiddie Car
SD	KAF364	Dacotah
TN	KIG448	Blue Chip
TX	KKI724	Eagle Nest
UT	KOF429	Uncle Mike
VA	KIG449	Blue Flight
VT	KCC595	Pico
WA	KOF430	Fur
WI	KSC954	Badger
WV	KQD407	Lowland
WY	KOF431	King
PR*	WWA353	Pineapple
HQ**	KGC463	Aero

*Puerto Rico
**National CAP, Washington, DC

Military Affiliate Radio System (MARS)

The Department of Defense sponsors a worldwide network of radio stations utilizing amateur radio operators to carry personal messages between military personnel and their families.

Voice phone patches, radioteletype and CW are all used to sustain this morale effort among Army, Air Force and Navy men and women.

Frequency assignments come from the Department of Defense and some frequencies are used by more than one service branch on a time sharing basis.

U.S. Air Force Mars

Primary Use	Frequency	Freq Code	Emission
ALASKA GATEWAY	7938.0	AK-2	USB/CW/RTTY/DATA
ALASKA GATEWAY	9047.0	AK-3	USB/CW/RTTY/DATA
ALASKA GATEWAY	9224.0	AK-4	USB/CW/RTTY/DATA
ALASKA GATEWAY	13985.0	AK-1 WSDN-3	USB/CW/RTTY/DATA
ALASKA GATEWAY	15712.0	AK-5	USB/CW/RTTY
ALASKA GATEWAY	19200.0	AK-6	USB/CW/RTTY/DATA
ALASKA GATEWAY	24573.5	AK-7	USB/CW/RTTY
ALASKA INTERTHEATER	4061.0	ALS IT	USB/CW/RTTY
ALASKA INTERTHEATER	4758.0	ALS IT	USB/CW/RTTY
ALASKA INTERTHEATER	4815.0	ALS IT	CW

ALASKA INTERTHEATER	4882.0	ALS IT	USB/CW/RTTY
ALASKA INTERTHEATER	4885.0	ALS IT	LSB/CW/RTTY
ALASKA INTERTHEATER	6995.0	ALS IT	USB/LSB/CW/RTTY
ALASKA INTERTHEATER	7331.0	ALS IT	USB/CW/RTTY
ALASKA INTERTHEATER	10140.0	ALS IT	USB/CW/RTTY
AZORES PHONE PATCH	7633.5	ACJ	USB/CW/RTTY
AZORES PHONE PATCH	13927.0	ACB	USB/CW/RTTY
AZORES PHONE PATCH	14606.0	ACF	USB/CW/RTTY/DATA
CENTRAL/SOUTH AMER GATEWAY	7540.0	CSA GW	LSB
CENTRAL/SOUTH AMER INTERTHEATER	13927.0	CSA IT	LSB
CENTRAL/SOUTH AMER INTERTHEATER	13977.0	CSA IT	LSB
EUROPE PHONE PATCH	20188.5	ACG	USB/CW/RTTY/DATA
EUROPEAN DIAMOND NT	14372.5	ER-3	USB/CW/RTTY/AM
EUROPEAN DIAMOND NT	14505.0	ER-4	USB
EUROPEAN RUBY NET	3875.0	ER-1	USB
GERMANY GATEWAY	11098.5	D GW	USB/CW/RTTY
GERMANY INTERTHTR	3802.5	D IT	CW
GERMANY INTERTHTR	3888.0	D IT	CW/RTTY/AM
GERMANY INTERTHTR	3888.0	ER-3	USB
GERMANY PHONE PATCH	14390.5	ACE	USB/CW/RTTY
GERMANY RTTY GATEWY	7457.0	D GW	USB/RTTY
GERMANY RTTY GATEWY	18155.0	D GW	CW/RTTY
GERMANY/PAC PHONE PATCH	11407.0	ACA PCK-1	USB/CW/RTTY
GREECE INTERTHEATER	3966.0	GRC IT	USB
GREENLAND GATEWAY	7799.0	GRL GW	USB
GRL/GERMANY GATWAY	6775.0	GRL/D GW	USB
GUAM PHONE PATCH	20991.0	PCG-2 PS-6	USB/CW/RTTY
GUAM PHONE PATCH	27736.0	PCG-3	USB/CW/RTTY
GUAM PHONE PATCH	27829.0	0CG-4	USB/CW/RTTY
GAUM/HI INTERISLAND	7360.0	GUM II HWA II	USB/CW/RTTY
HAWAII INTERISLAND	4054.0	HWA II	USB/CW/RTTY
HAWAII INTERTHEATER	7312.0	HWA IT	USB/CW/RTTY
HAWAII INTERTHEATER	7315.0	HWA IT	USB/CW/RTTY
JAPAN INTERISLAND	7407.0	J II	USB/CW/RTTY
JAPAN INTERTHEATER	3841.0	J IT	USB
JAPAN INTERTHEATER	4633.0	J IT	USB
JAPAN INTERTHEATER	4638.0	J IT	USB
JAPAN INTRAISLAND	8177.0	J II	USB/CW/RTTY
JAPAN PHONE PATCH	13614.0	PCJ-2	USB/CW/RTTY
JAPAN PHONE PATCH	14829.0	PCJ-3 PRR-1	USB/CW/RTTY
JAPAN PHONE PATCH	20807.0	PCJ-4 PS-4 PRR-3	USB/CW/RTTY
JAPAN PHONE PATCH	23862.0	PCJ-5 PRR-6	USB/CW/RTTY
JAPAN/KOREA INTER-THEATER	8178.5	J/KOR IT	USB/CW/RTTY
KOREA INTERTHEATER	3496.0	KOR IT	USB/RTTY
KOREA PHONE PATCH	14389.0	PCK-2 WSDN-4	USB/CW/RTTY
KOREA PHONE PATCH	15632.0	PCK-3 PRR-4	USB/CW/RTTY
PACAF INTERTHEATER	7357.0	PAC IT	USB/CW/RTTY
PACAF INTRATHEATER	15805.5	PS-2	USB/CW/RTTY
PACIFIC INTRATHTR	19937.0	PS-3 PCK-4	USB/CW/RTTY
PACIFIC RTTY GATEWY	15807.0	PAC RATT GW	USB/CW/RTTY
PACIFIC RTTY GATEWY	24019.0	PAC RATT CW PRR-7	USB/CW/RTTY

AIR FORCE

PANAMA INTERTHEATER	3454.0	PNR IT	LSB
PANAMA INTERTHEATER	3545.0	PNR IT	USB
PANAMA INTERTHEATER	7305.0	PNR IT	LSB
PANAMA INTERTHEATER	7305.0	PNR IT	USB
PANAMA PHONE PATCH	27978.5	TINKER AFB/ HOWARD AB	USB
PHILIPPINES INTER-	4912.0	PHL IT	USB/CW/RTTY
PHIL PHONE PATCH	10267.0	PCP-1	USB/CW/RTTY
PHIL PHONE PATCH	10270.0	PCP-2	USB/CW/RTTY
PHIL PHONE PATCH	14402.0	PCP-3	USB/CW/RTTY
PHIL PHONE PATCH	14530.0	PCP-4	USB/RTTY
PHIL PHONE PATCH	14877.0	PCP-6	USB/CW/RTTY
PHIL PHONE PATCH	16452.0	PCP-78	LSB/USB/CW/RTTY
PHIL PHONE PATCH	17670.0	PCP-8	USB/CW/RTTY
PHIL PHONE PATCH	19226.0	PCP-9	USB/CW/RTTY
PHIL PHONE PATCH	27991.0	PCP-11 PS-7	USB/CW/RTTY
REGION 1	3315.0	RA(1)	USB/CW/RTTY
REGION 1	4593.5	RB(1)	USB/CW/RTTY/DATA
REGION 1	7324.0	RC(1)	USB/CW/RTTY/DATA
REGION 2	3299.0	RD(2)	USB/CW/RTTY/DATA
REGION 2	4577.0	RE(2)	USB/CW/RTTY/DATA
REGION 2	7313.5	RF(2)	USB/CW/RTTY
REGION 2-RTTY NET	4500.0	2R1(2)	LSB/CW/RTTY/AM
REGION 3	3308.0	RG(3)	USB/CW/RTTY/DATA
REGION 3	4517.0	RH(3)	USB/DATA
REGION 3	7305.0	RI(3) RT(5)	USB/RTTY
REGION 4	3370.5	RJ(4)	USB/CW/RTTY/DATA
REGION 4	4557.0	RK(4)	USB/CW/RTTY/DATA
REGION 4	7302.0	RL(4)	USB/CW/RTTY/DATA
REGION 5	3292.0	RM(5)	USB/CW/RTTY
REGION 5	4450.0	RN(5)	USB/CW/RTTY/AM
REGION 5	7329.0	RO(5)	USB/CW/RTTY/DATA
REGION 6	3296.0	RP(6)	USB/CW/RTTY/DATA
REGION 6	4575.0	RQ(6)	USB/CW/RTTY/DATA
REGION 6	7457.0	RR(6)	USB/CW/RTTY/DATA
SPACE DIV WORLDWIDE	14405.0	WSDN-5	USB/CW/RTTY
SPACE DIV WORLDWIDE	20870.0	WSDN-5	USB/CW/RTTY
SPACE DIV WORLDWIDE	27985.0	WSDN-7	USB/CW/RTTY
TCON AD TECH TVRS-1	3312.0	TVRS-1	USB/CW/RTTY/DATA
TCON AD TECH TVRS-2	4588.5	TVRS-2	USB/DATA
TCON AD TECH TVRS-3	6775.0	TVRS-3	USB/CW/RTTY/DATA
TCON AD TECH TVRS-4	7680.0	TVRS-4	USB/CW/RTTY/DATA
TCON AD TECH TVRS-6	14529.5	TVRS-6	USB/CW/RTTY/DATA
TCON AD TECH TVRS-7	17487.0	TVRS-7	USB/CW/RTTY/DATA
TCON AD TECH TVRS-8	26910.0	TVRS-8	DATA/AM
TCON TRR/TRVRS/ TRC-5	11619.5	TRR-5 TVRS-5 TRC-5	USB/CW/RTTY/DATA
TRANSCON CALLING	2624.0	CA(T)	USB/CW/RTTY
TRANSCON CALLING	3311.0	CB(T)	USB/CW/RTTY/DATA
TRANSCON CALLING	4590.0	CC(T)	USB/CW/RTTY/DATA
TRANSCON CALLING	7540.0	CD(T)	USB/CW/RTTY/DATA
TRANSCON CALLING	13993.0	CE(T)	USB/CW/RTTY/DATA
TRANSCON CALLING	20737.0	CF(T)	USB/CW/RTTY
TRANSCON CW	3311.0	TRC-1	USB/CW/RTTY/AM
TRANSCON CW	3347.0	TRC-2	CW/RTTY
TRANSCON CW	4878.0	TRC-3	LSB/CW/RTTY
TRANSCON CW	6994.0	TRC-4	USB/CW/RTTY
TRANSCON CW	14527.J0	TRC-7	USB/CW/RTTY

TRANSCON CW	20960.0	TRC-8 PS-5 PRR-2	USB/CW/RTTY
TRANSCON CW	27994.0	TRC-9	USB/CW/RTTY
TRANSCON RTTY	3228.0	TRR-1	USB/RTTY
TRANSCON RTTY	4872.0	TRR-2	USB/CW/RTTY/DATA
TRANSCON RTTY	7831.5	TRR-3	USB/CW/RTTY/DATA
TRANSCON RTTY	7913.5	TRR-5	USB/CW/RTTY/DATA
TRANSCON RTTY	15513.5	TRR-6	USB/CW/RTTY/DATA
TRANSCON RTTY	23863.5	TRR-7	USB/CW/RTTY
TRANSCON RTTY	27877.0	TRR-8	USB/CW/RTTY
TRANSCON TRAFFIC	13977.0	T1(T) ACC APCN-1 PPCN-1	USB/CW/RTTY
TRANSCON TRAFFIC	4560.0	T4(T)	USB/DATA
TRANSCON TRAFFIC	4765.0	TM(T)	USB/CW/RTTY/DATA
TRANSCON TRAFFIC	4832.0	TN(T)	USB/CW/RTTY
TRANSCON TRAFFIC	4842.0	TO(T)	USB/CW/RTTY
TRANSCON TRAFFIC	7527.0	TW(T) WSDN-2	USB
TRANSCON TRAFFIC	7545.0	TR(T)	USB/CW/RTTY
TRANSCON TRAFFIC	7632.0	TS(T)	USB/CW/RTTY
TRANSCON TRAFFIC	13996.0	TU(T) TRC-6	USB/CW/RTTY
TRANSCON TRAFFIC	20740.0	TV(T)	USB/CW/RTTY
TRANSCON TRAFFIC	4602.6	TX(T)	USB/DATA
UNASSIGNED	2049.0		USB
UNASSIGNED	3231.0		USB/CW/RTTY
UNASSIGNED	4447.0		USB/CW/RTTY
UNASSIGNED	4450.0		USB
UNASSIGNED	4466.0		CW/RTTY
UNASSIGNED	4593.5		USB/CW/RTTY
UNASSIGNED	5740.0		USB
UNASSIGNED	7862.5		USB/RTTY/AM
UNASSIGNED	10273.5		USB/CW/RTTY
UNASSIGNED	10576.0		USB/CW/RTTY
UNASSIGNED	11121.0		USB/CW/RTTY/DATA
UNASSIGNED	13498.0		USB/CW/RTTY
UNASSIGNED	14408.0		LSB/CW/RTTY/DATA
UNASSIGNED	14408.0		USB
UNASSIGNED	14411.0		LSB/USB/CW/RTTY
UNASSIGNED	15083.5		USB/CW/RTTY
UNASSIGNED	19612.0		USB/RTTY
UNASSIGNED	19615.0		USB/CW/RTTY
UNASSIGNED	20763.0		USB/CW/RTTY
UNASSIGNED	20873.0		USB
UNASSIGND	20992.5		USB/CW/RTTY
UNASSIGNED	20994.0		USB/CW/RTTY
UNASSIGNED	22947.0		USB/CW/RTTY
UNASSIGNED	22950.0		USB/CW/RTTY
UNASSIGNED	23865.0		USB/CW/RTTY
WORLDWIDE FREQ	6996.0	WSDN-1 PCJ-1 ER-2	USB/CW/RTTY/DATA

AIR FORCE

U.S. Air Force MARS Callsign Identifications

REGION 1

AGA1AD	Andrews AFB DC
1AN	Andrews AFB DC
1AS	Andrews AFB DC
1BA	Barnes MAP, Westfield MA
1BC	Battle Creek ANGB MI
1BG	Bangor IAP ME
1BM	Baltimore MD
1BR	Bradley ANGB CT
1BU	Burlington IAP VT
1BW	Rickenbacker AFB OH
1CO	Coventry ANGS RI
1DC	Pentagon DC
1DO	Dover AFB DE
1FA	Ft Wayne MAP IN
1FW	Ft Wayne MAP IN
1GR	Grisson AFB IN
1HA	Hanscom AFB MA
1HU	Hulman Field IN
1KI	K I Sawyer AFB MI
1MA	Mansfield Lahm Aprt OH
1MC	McGuire AFB NJ
1MG	McGuire AFB NJ
1MI	Harrisburg IAP Middletown PA
1MU	McGuire AFB NJ
1NC	Griffiss AFB NY
1NE	Newark AFS OH
1NI	Niagara Falls IAP NY
1NS	N Smithfield RI
1OR	Orange ANGS CT
1PE	Pease AFB OH
1RB	Rickenbacker AFB OH
1RI	Rickenbacker AFB OH
1RO	Roslyn ANGS NY
1SA	Springfield MAP OH
1SC	Schenectady CO Aprt NY
1SE	Selfridge ANGB MI
1SM	Springfield MAP OH
1SO	Springfield MAP OH
1SP	S Portland ANGS ME
1SU	Suffolk Co ANGB NY
1SX	Deployed Element
1SY	Hancock Field NY
1TE	Toledo Express Arpt Swanton OH
1TF	TF Green Arpt Warwick RI
1WE	Wellesley ANGS MA
1WG	Willow Grove NAS PA
1WH	Westchester Co Aprt White Plains NY
1WI	Gtr Wilmington Aprt DE
1WO	Worcester ANGS MA
1WP/B	Wright-Patterson AFB OH
1WS	Westover AFB MA
1WU	Wurtsmith AFB MI
1WX	Deployed Element
1YO	Youngstown MAP OH
AIR	Andrews AFB DC

REGION 2

AGA2AT	Martin ANG Stn Gadsden AL
2AX	Deployed Element
2CH	Charleston AFB SC
2DO	Dobbins AFB GA
2DU	Charlotte NC
2EA	Eastover SC
2EG	Eglin AFB FL
2HU	Hurlburt Fld FL
2KA	Kanawha Co Aprt Charleston WV
2LA	Langley AFB VA
2MA	Maxwell AFB AL
2MB	Myrtle Beach AFB SC
2MC	McEntire ANGB Eastover SC
2MD	MacDill AFB FL
2ME	Memphis TN
2MH	Myrtle Beach AFB SC
2MO	Moody AFB GA
2MR	E WV Reg Aprt(ANG) Martinsburg WV
2MT	McGhee Tyson Aprt Knoxville TN
2MY	McGhee Tyson Aprt Knoxville TN
2NA	Nashville TN
2NC	Badin NC
2PA	Patrick AFB FL
2PO	Pope AFB NC
2PP	Pope AFB NC
2PT	Patrick AFB FL
2PX	Deployed Element
2RB	Robins AFB GA
2RH	Hurlburt Fld FL
2RO	Robins AFB GA
2RX	Quick Reaction Package (QRP)
2SA	Savannah MAP GA
2SH	Shaw AFB SC
2SJ	Seymour-Johnson AFB NC
2SN	Byrd IAP VA
2SS	Birmingham Muni Aprt AL
2ST	St Simons Is GA
2SZ	Shaw AFB SC
2TY	Tyndall AFB FL

REGION 3

AGA3AF	HQ AFCC/XOPRM Scott AFB IL
3BM	Billy Mitchell Fld Milwuakee WI
3CA	Capital MAP Springfield IL
3CH	Chanute AFB IL
3CS	Scott AFB IL
3DI	Duluth ANGB MN
3FA	N Dakota St Univ Fargo ND
3HQ	Scott AFB IL
3LI	Lincoln ANGB NE
3MA	Traux Fld Madison WI
3MC	McConnell AFB KS

3MI	Minn St Paul IAP MN
3OH	O'Hare ARF Facility IL
3OR	O'Hare IAP Chicago IL
3PE	Gtr Peoria Aprt IL
3RG	Richards-Gebaur AFB MO
3SF	Joe Foss Field SD
3SI	Sioux City MAP IA
3SJ	Rosecrans Mem Aprt MO
3SL	Bridgeton MO
3SP	Minn St Paul IAP MN
3VO	Volk Fld Camp Douglas W
3WH	Whiteman AFB MO

REGION 4

AGA4AL	Altus AFB OK
4BE	Bergstrom AFB TX
4CO	Columbus AFB MS
4DY	Dyess AFB TX
4DZ	Dyess AFB TX
4EI	Bergstrom AFB TX
4EL	Ellington AFB TX
4EN	England AFB LA
4FS	Ebbing ANGB Ft Smith MAP AR
4GA	Garland ANGS TX
4GO	Goodfellow AFB TX
4GX	Deployed Element
4HE	Hensley Fld Dallas TX
4HS	Mem Aprt Hot Springs AR
4JA	Jackson MS
4KE	Kelly AFB TX
4KL	Kelly AFB TX
4KR	Keesler AFB
4KS	Keesler AFB MS
4LA	Laughlin AFB TX
4LI	Little Rock AFB AR
4LP	LaPort ANGB TX
4LR	Little Rock AFB AR
4LZ	Little Rock AFB AR
4MA	Camp Mabry Austin TX
4ME	Meridian MS
4NO	USNAS New Orleans LA
4RA	Randolph AFB TX
4RE	Reese AFB TX
4SH	Sheppard AFB TX
4TI	Tinker AFB OK
4TK	Tinker AFB OK
4TN	Tinker AFB OK
4TU	Tulsa OK
4TX	Deployed Element
4VA	Vance AFB OK
4WR	Will Rogers ANGB OK

REGION 5

AGA5BE	Bellingham WA
5BO	Boise ID
5BU	Buckley ANGB CO
5CH	Cheyenne MAP WY
5FA	Fairchild AFB WA
5FI	Fairchild AFB WA
5HI	Hill AFB UT
5LO	Lowry AFB CO
5MC	McChord AFB WA
5MU	Camp Murray Tacoma WA
5MX	Deployed Element
5MZ	McChord AFB WA
5PE	Peterson AFB CO
5PO	Portland IAP OR
5PT	Peterson AFB CO
5SE	Seattle WA
5SL	Salt Lake City UT
5SP	Spokane IAP WA
5TA	Camp Murray Tacoma WA

REGION 6

AGA6CA	Cannon AFB NM
6CM	Costa Mesa CA
6CO	Compton CA
6DM	Davis-Monthan AFB AZ
6ED	Edwards AFB CA
6GE	George AFB CA
6HA	NAS Moffett Fld CA
6HO	Holloman AFB NM
6HY	Hayward ANGB CA
6KI	Kirtland AFB NM
6KR	Albuquerque NM
6LA	Los Angeles CA
6LU	Luke AFB AZ
6MA	March AFB CA
6MC	McClellan AFB CA
6ML	McClellan AFB CA
6MT	Mather AFB CA
6NE	Nellis AFB NV
6NH	N Highland CA
6NO	Norton AFB CA
6NX	Deployed Element
6ON	Ontario IAP CA
6PH	Phoenix AZ
6PO	Phoenix AZ
6TR	Travis AFB CA
6RE	Reno NV
6TO	Torrence CA
6TU	Tucson AZ
6TV	Travis AFB CA
6VA	Vandenberg AFB CA
6VN	Van Nuys CA
6VY	Sepulveda ANGS Van Nuys CA
6WI	Williams AFB AZ

REGION 7 (Europe/Middle East/Africa)

AGA7AR	Araxos Greece

AIR FORCE

7AT	Athens Greece
7AU	Augsburg Germany
7BI	Bitburg AB GErmany
7CN	Camp New Amsterdam Netherlands
7DR	Drama Greece
7HA	Hahn AB Germany
7HE	Hessisch-Oldendorf Germany
7IR	Iraklion Crete
7KA	Kalkar AS Germany
7LE	Levkas Greece
7LI	Lindsey AS Germany
7MH	Mt Hortiatis Greece
7MP	Mt Pateras Greece
7RA	Ramstein AB Germany
7RE	Reisenbach Germany
7RM	Rhein Main AB Germany
7SP	Spangdahlem AB Germany
7ZW	Zweibrucker AB Germany

REGION 8 (Pacific/Far East)

AGA8CL	Clark AB Philippines
8CJ	Choe Jong San Korea
8EN	Hickam AFB HI
8FR	Ft Ruger Hawaii
8GO	Gozar AS Philippines
8HI	Hickam AFB Hawaii
8HY	Hampyeong, Korea
8JI	Johnston Island
8KJ	Kwang Ju Korea
8KR	Kotar Korea
8MI	Misawa AB Japan
8MN	Mindanao Philippines
8MS	Mangil San Korea
8OS	Osan AB Korea
8PH	Pohang Term Korea
8PS	Palgong San Korea
8RC	Camp Red Cloud Korea
8TA	Taegu AB Korea
8WA	Wallace AS Philippines
8WI	Wake Island
8YO	Yongmun San Korea

REGION 9 (Alaska)

AGA9CA	Campion AFS AK
9CB	Cold Bay AFS AK
9CE	Clear AFS AK
9CL	Cape Lisburne AFS AK
9CN	Cape Newenham AFS AK
9CR	Cape Romanzof AFS AK
9EI	Eielson AFB AK
9EL	Elmendorf AFB AK
9FA	Fairbanks AK
9FY	Ft Yukon AFS AK
9FR	Ft Richardson AK
9GA	Galena Arpt AK
9IM	Indian Mt AFS AK
9JU	Juneau AK
9KO	Kotzebue AFS AK
9KS	King Salmon AFS AK
9KU	Kulis ANGB Anchorage AK
9MD	Murphy Dome AFS AK
9MF	Miller Freeman (NOAA ship)
9NG	Anchorage AK
9SH	Shemya AFB AK
9SP	Sparrevohn AFS AK
9TA	Tatalina FS AK
9TC	Tin City AFS AK
9WA	Palmer AK

REGION 10 (Caribbean, Central/ South America)

AGA0AS	Paraguay
0BR	Brazil
0CO	Colombia
0TG9	Guatemala
0HA	Port-au-Prince Haiti
0HO	Howard AFB Balboa Panama
0JA	Kingston Jamaica
0MU	Muniz ANGB PR
0NI	Nicaragua
0PE	Peru
0QU	Quito Ecuador
0SS	El Salvador
0TE	Honduras
0UR	Uruguay
0VE	Venezuela

OTHER

CUW20	Lajes AB Azores
XP1AB	Sondrestrom AB Greenland

Special Call Signs

REGION 1

AFA1L	Command MARS Director Air Force Logistics Command
AGA1Q	MARS Director Andrews AFB MD

REGION 2

AGA2R	Command MARS Director AFRES
AFA2T	Command MARS Director Tactical Air Command

REGION 3

AGA3C	Chief MARS, USAF
AGA3D	USAF MARS Director

REGION 4

AGA4S	Command MARS Director, USAF Security Service

AGA4T	Command MARS Director, Air Training Command
REGION 7	
AGA7E	Command, MARS Director, USAFE
REGION 8	
AGA8P	Command MARS Director, Pacific Air Forces
REGION 9	
AGA9A	Command MARS Director, Alaska Air Command
REGION 0	
AGA0S	MARS Director, Howard AFB Panama
AIR	USAF HQ Pentagon (via Andrews AFB)

Canada

Canadian Forces Bases/Airfields

Al Ismailiyah, Egypt
Alert
Bagotville, PQ
Chatham, NB
Cold Lake, AL
Comox, BC
Edmonton, AL
Georgetown, NB
Greenwood,NS
Halifax, NS
Lahr, W Germany
Montreal, PQ
North Bay, ON
Ottawa, ON
Petawana, ON
Portage, MN
Shearwater
St Johns
Summerside, PEI
Trenton, ON
Toronto, ON
Valcartier, PQ
Vancouver, BC
Winnipeg, MN

Canadian Military Aeronautical Communications System (MACS)

Frequencies USB

kHz	User
3046	Halifax - VOLMET H+50
3092	Edmonton
	Lahr
	St Johns
	Trenton
4704	Al Ismailiyah
	Edmonton
	Lahr
	St Johns
	Trenton
4730	Halifax
4752	Halifax
5690	Al Ismailiyah
	Lahr- wx 2000-0800, H+16
5703	Shearwater
5718	Edmonton
	Halifax
	St Johns
	Trenton
	Victoria
6693	Halifax
	Edmonton - wx H+20
	Trenton - wx H+30
	St Johns - wx H+40
6705	Alert
	Edmonton
	Lahr
	St Johns
	Trenton
6708	Shearwater
6716	Halifax RCC
	St Johns
	Vancouver
6746	*Halifax - wx
6753	Edmonton- wx 2300-1200, H+20
	Lahr
	North Bay
	St Johns - wx H+40
	Trenton - wx H+30
8984	North Bay
9006	Al Ismailiyah
	Edmonton
	Lahr
	St Johns
	Trenton
9010	Halifax
	Vancouver
11233	Al Ismailiyah
	Alert
	Edmonton
	Halifax
	Lahr
	St Johns
	Trenton
11249	Halifax - wx
	Vancouver
13231	Al Ismailiyah
	Lahr- wx 0800-2000 H+16
13254	*Halifax
13257	Al Ismailiyah
	Edmonton
	Lahr
	St Johns
13970	Golan Heights
	(See CFAR)
	Trenton
15031	Edmonton
	Lahr
	St Johns
	Trenton
15035	Edmonton- wx 1200-2300 H+20
	Trenton- wx H+30

	St Johns- wx H+40
17995	Edmonton
	St Johns
	Trenton
18012	Edmonton
	Lahr
	St Johns
	Trenton
18027	Halifax
23250	Trenton

* Tactical broadcasts H+51
** See "wx" station aviation weather schedule below.

Weather Schedule/Call Signs

H+16	Lahr	DHM95/VEG
H+20	Edmonton	VXA
H+30	Trenton	CHR
H+40	St Johns	CJX
H+50	Halifax	CFX/CFH*
	Vancouver	CKN

*CFH RTTY

(75 Bd/850 Hz Shift)

Simulcasts:
(1) 4347 6452 8542 12814 17084
(2) 4225 6450 8662 12985 16880 22336.5
also 4271 6330 10536 13510

Submarine Distress Buoys: 4340

Vancouver Military

Freq: 11236
Mode: RTTY/USB

Cuban Air Force

9018 USB

French Military

Freq	Mode	Service
2436		Toulon Navy Control Center
8625	CW	FUM
11271		Air Force,RFFUID Biscarrose
11300	USB	FUM,Tahiti?
12597	CW	FUM,Papeete,Tahiti
12665	CW	FUM
13239	USB	Air Force;Air-Ground
16951.5	CW	6WW,Dakar,Senegal
17380	CW	FUM
18001.5	USB	French Air Force (Dakar)
22545	CW	FUM,Tahiti
23254	USB	Air Force "FDX" Paris (Ft de France)

Great Britain

Royal Air Force/Navy Air to Ground Communications

(RAF Command Post; Alconbury, England)

Freq.	User	Location
3046	RAF	Alconbury
3095	RAF	Salah, Oman
3109	RAF	Alconbury
3116	RAF	Gan Island, Maldives
3120	RAF	Upavon
3885	RN	Culdrose, Eng.
4140	RN	Culdrose, Eng.
4477	RAF	Alconbury
4719	RAF	Architect
4722	RAF	VOLMET
4730	RAF	Akrotiri, Cyprus H24
4732	RAF	Upavon, Eng.,-H24
	RAF	Belize City
	RAF	Luqa, Malta
	RAF	Gibraltar 2000-0700
4742	RAF	Strike Command*
5450	RN	Yeovilton
5695.5	RAF	Salah, Oman
5729	RAF	Strike Command*
6562	RAF	Seychelles
6686	RAF	Pitreave, Scotland
6693	RAF	Tynemouth
6705	RN	Prestwick, Scotland
6707	RAF	Combin, Cyprus
6708	RN	Yeovilton
6730	RAF	Strike Command 0700-1800
6738	RAF	Strike Command*
6741	RAF	Alconbury
6751	RAF	Akrotiri, Cyprus 0500-1600
6825	RN	Culdrose, Eng.
8967	RAF	Gan Island, Maldives
	RAF	Seychelles
8975	RAF	Tactical
8984	RAF	Alconbury
8990	RAF	Strike Command 0700-1800

9025	RAF	Alconbury
9032	RAF	Upavon-H24
	RAF	Bermuda
	RAF	Luqa, Malta
	RAF	Pitreave, Scot
	RAF	Strike Command*
9043	RAF	Pitreave, Scotland
11185		VIP flights
11200	RAF	VOLMET
11204	RAF	Strike Command*
11212	RAF	Edinburgh
11224	RAF	Upavon
11234	RAF	Upavon-H24
	RAF	Bermuda
	RAF	Akrotiri-H24
	RAF	Luqa, Malta
	RAF	Belize City
	RAF	Gibraltar 0700-2000
	RAF	Diego Garcia
	RAF	Bumpton
	RAF	Strike Command*
11257	RAF	Alconbury
13205	RAF	Seychelles
13216	RAF	Gan Island, Maldives
13234	RAF	Tactical
13250	RAF	Cyprus
13257	RAF	Strike Command 0700-1800
15013	RAF	Upavon
15031	RAF	Strike Command 0700-1800
17980	RAF	Tactical**
18018	RAF	Akrotiri 0700-1800
	RAF	Strike Command 0700-1800
20511	RAF	Gibraltar
21886	RAF	Seychelles
23220	RAF	Upavon-H24
	RAF	Strike Command 0700-1800

The H+30 broadcasts list the aerodrome followed by a color to indicate weather conditions (blue, white, green or yellow). Broadcast are on 4742, 6738, 9032, 11204 and 18018 kHz.

*RAF Strike Command Integrated Communications System, (STCICS; callsign "Architect") transmits weather forecasts at H+00 and H+30 after the hour. The H+00 forecast lists the aerodrome with a three digit number denoting conditions.

**Broadcasts are at H-20 and H-50 with foxtrot type messages. Station IDs with tactical ID of alfa/numeric makeup and changes daily. May be part of NATO.

VIP Code Names

ASCOT	RAF transport aircraft
RAINBOW	Prince Phillip
UNICORN	Prince Charles
KITTYHAWK	Queen Elizabeth

Australia and New Zealand

Royal Australian Air Force & Royal New Zealand Air Force Air to Ground

3032	RAAF	Sydney 0900-2100 (Darwin,Perth,Townsville)
3130	RAAF	
4703	RNZAF	Auckland
	RNZAF	Ohakea
	RNZAF	Wigram
5688	RAAF	Darwin 0900-2100
	RAAF	Pearce
	RAAF	Perth
	RAAF	Sydney
	RAAF	Townsville
5695	RAAF	Australia
	RAAF	Butterworth, Malaysia - Search & Rescue
5707	RNZAF	Auckland
5835	RAAF	Perth
6676	RAAF	Sydney (Volmet)
6699.5	RAAF	
6720	RAAF	
6723	RNZAF	Auckland
	RNZAF	Ohakea
	RNZAF	Wigram
8971	RAAF	
8907	RNZAF	Auckland
8975	RAAF	Sydney H24 Darwin,Perth,Townsville
8980	RAAF	Amberly (primary) 2200-0500
8984	RNZAF	Auckland
8992	RNZAF	Auckland
	RNZAF	Ohakea
	RNZAF	Wigram
9005	RAAF	Warranbool
11201	RAAF	
11214	RAAF	Amberly (secondary) 2200-0500
11235	RAAF	Darwin (day pri) 2100-0900
	RAAF	Perth
	RAAF	Sydney
	RAAF	Townsville
11247	RAAF	Sydney

	RNZAF	Auckland
	RNZAF	Ohakea
	RNZAF	Wigram
13205	RAAF	Sydney 2100-0400 Perth,Darwin,Townsville
13245	RAAF	
13251	RNZAF	Christchurch
17983	RAAF	
18027	RAAF	Perth, Sydney

Tactical Identifiers

ADELPHI	RNZAF Aircraft
AUSY	RAAF on intl flights
AUSY 624,25, 27,29	Boeing 707 No.34 Squadron
ALADDIN	Macchi
BUCKSHOT	Flight of F-111Cs
BUFFALO	Chinook helicopter
CONSORT	HS-748
DESPOT	Mirage
EAGLE	Iroquois UH-1 helicopter
ENFIELD	Caribou
ENVOY	BAC-111, HS-748
FALCON	F-111C
KIWI	RNZAF Aircraft
MACH	F-18 Hornet
MAPLE	Mirage
MARINER	Lockheed P-3 Orion
RAMROD	Mirage
REGENT	Mystere Falcon, BAC-111
ROLLER	CT-4 Airtrainer
SHEPHERD	Lockheed P-3C Orion
STALLION	Lockheed Hercules
STINGRAY	Lockheed P-3B Orion
STRIKER	Lockheed P-3A Orion
TESTER	Test flight
TORCH	Macchi
TROJAN	Lockheed Hercules
WALLABY	Caribou
WINDSOR	Boeing 707 within Australia
WISDOM	HS-748
WOMBAT	Caribou

RAAF Facilities
(also Civil Airport)

Alice Springs
Amberley
Butterworth, Malaysia
Cambera
Darwin
Edinburgh
Gingin
Learmonth
Point Cook
Sattler
Townsville
Williamtown

RNZAF Facilities

Ohakea
Whenuapai

West German Air Force

Base Callsign: DHM91
Frequencies kHz: 5691 11187 13248 17992
Munster Radio: 18006 13246 11266

Philippines

6525	Fernando Air Base, Luzon, Philippines Air Force
6700.5	Philippines Bureau of Air Transport

Saudi Arabian Air Force

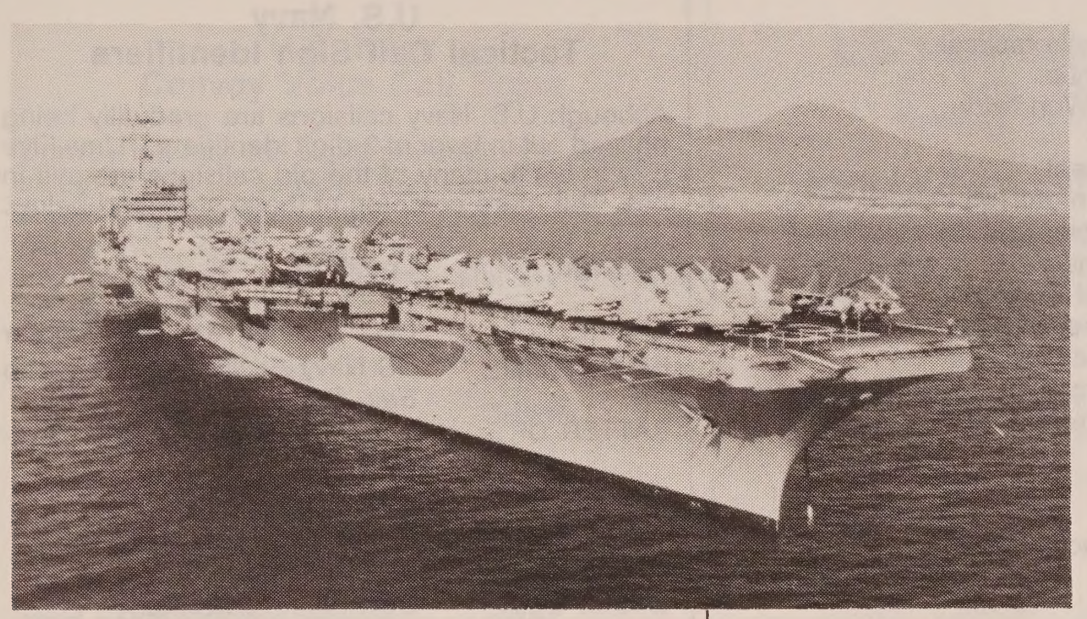
Ground to Air Communications

kHz	GMT	Airport
3095	1900-0400	Dhahran Int'l
		Khamis Mushait
		Bisha
		Gizan
		Taif
		Nejran
		Madinah
5526	1900-0400	Riyadh
		Tabuk
		Jouf
		Hail
		Wejh
8967	0400-1900	same as 3905
8990	0400-1900	Dhahran Int'l
		Ruydah

South Africa

Military In-Flight

3116	Ground Use
3932	
4703	Search & Rescue
5680	Tower
5695	Internal, Secondary
6687	
8975	Internal, Primary
8992	
11237	Overseas, Primary
15056	
17993	Overseas, Secondary
21860	
23287	



United States

U.S. Navy Radiocommunications Frequencies (USB/RTTY)

RTTY MULCAST consists of 16 channels 85Hz shift, 85Hz separation, 75 or 50 baud. NORMAL RTTY is 850 shift. Tactical ID's are typically letter-number-letter: ("Alpha 6 Uniform"). Frequency hopping is often heard when voice stations "go green".

Freq	Use
2130	U.S.Coastal
2150	Harbor Control
2368	Harbor Control
2434	Harbor Control
2550	Disaster Net
2586	Harbor Control
2630	Harbor Control
2716	Harbor Control
2732	Lockheed/Nuclear Subs
2745	NAVFAC Grand Turk
2836	Harbor Control
3023	Search and rescue
3050	Air-Ground
3053	Ships/Tactical
3088	ASW
3095	Atlantic Fleet tactical
3109	Air-Ground/Gulf of Mexico
3130	COMSTA Pacific
3237	PMFR Barking Sands/ Outrider Control
3261	NORATS Norfolk
3265	Atlantic Fleet tactical
4014	Air-Ground Atlantic
4045	NORATS Norfolk
4082	PMFR Barking Sands/ Outrider Control
4152	Tactical
4253	Lockheed/Nuclear Subs
4359	NAS
4373	Virginia Capes
4377	Pacific Fleet tactical
4416	Pacific Fleet
4491	PMFR Barking Sands
4622.5	NAS
4700	ASW Pacific
4702	ASW Atlantic
4704	Atlantic/Pacific Fleets tactical
4707	ASW Pacific
4710.5	Air-Ground Atlantic
4711	Air-Ground Secondary
4730	ASW Atlantic
4735	PMFR Down range ships
4835	Philadelphia Shipyard ship/shore
5080	PMFR Range Clearance
5430	COMSTA
5446	USMC Tactical
5680	Search and rescue
5716.5	Atlantic Fleet
5718	Atlantic/Pacific Fleets tactical
5724	Atlantic/Pacific Fleets
6693	Pacific Fleet
6697	Primary Night tactical (HICOM)
6705	COMSTA
6708	Atlantic/Pacific Fleets tactical
6720	ASW & Scrambled tactical
6723	Universal
6742	ASW Atlantic
6746	PMFR Pt Mugu NAS
6799	Atlantic Fleet
7507	Hurricane Warning (pri)
7535	Atlantic Fleet
7645	Disaster Net

7839	Tactical
7885	ASW Atlantic tactical
7893	ASW Atlantic
8233.5	NORATS Worldwide
8757	TACSFAC
8778	Atlantic Fleet
8778	COMSTA night (primary) tactical
8972	ASW Atlantic (guard)
8976	ASW Atlantic
8981.5	Air-Ground Pacific
9002	Pacific Fleet tactical
9006	Atlantic Fleet tactical
9032	Pacific Aircraft
9037	Atlantic Aircraft (sec)
9124	Tactical
9257	Tactical
9260	Tactical
9380	Atlantic/Pacific Fleets
10730	Ops
11190	Tactical
11191	ASW Atlantic
11195	Atlantic Fleet
11198	Atlantic Fleet
11234	COMSTA RTTY Coord.
11252	ASW Atlantic
11255	Atlantic Fleet tactical
11261	CINCPAC
11267	Daytime Primary tactical (HICOM)
11410	COMSTA
11463	Atlantic Fleet
11570	Tactical
13147	Tactical
13169.5	Pacific Fleet
13181	COMSTA
13224	COMSTA
13227	Atlantic/Pacific Fleets tactical
13237	Atlantic/Pacific Fleets
13251	ASW Pacific
13629.5	Tactical
15021	Pacific Fleet
15051	Pacific Fleet tactical
15067	Tactical
15077	PMFR Down Range Ships
15087	Pacific Fleet
15520	Atlantic Fleet
17985	Atlantic Fleet tactical
18009	Pacific Fleet tactical
18162.5	Pacific tactical
23177	Pacific Fleet
23224	Pacific Fleet
23227	PMFR Down Range Ships
23288	COMSTA

U.S. Navy Tactical Call Sign Identifiers

Although U.S. Navy callsigns are gradually being phased out in favor of 3-digit identifiers ("Lima Five November"), many of the old callsigns are still in use. The more common of these are listed below.

Callsign	Location
ANGEL	UH-1 Marines rescue helicopter
BARBARIC	US Navy Facility, Guantanamo Bay, Cuba
BATTER UP	Any NAVCOMSTA this Frequency
CLIMAX	USS Enterprise CVAN-65
COMSERON	USCG Key West, Florida
COURAGE	USS America
EAGLE CLIFF	USS John F. Kennedy
FAIRFIELD	USS Saratoga
FISHER BODY	ATC Guantanamo Bay NAS, Cuba
GOLD EAGLE	USS Carl Vinson
GRAY EAGLE	USS Ranger
HAMPSHIRE	Commander Naval Forces Caribbean, Roosevelt Rds NAS, PR
HANDBOOK	USS Forrestal
HERSHEY	CINCLANT/Joint Air Reconnaissance Center, Key West
JITTERBUG	NAVCOMSTA Balboa, Canal Zone
MUSTANG	USS Coral Sea
OLD SALT	USS Nimitz
OTIS	KC-130 aircraft, Cherry Point MCAQS, NC
OVERWORK	Naval network general callsign
PANTHER	USS Kitty Hawk
PEDRO	Marines rescue helicopter
PLEAD CONTROL	Pacific Missile Firing Range
RAIDER	KC-130 aircraft, El Toro MCAS, GA
RASPBERRY	Naval air stations prefix
RAWHIDE BASE	Squadron VRC-40, Norfolk, Virginia
SCHOOL BOY	USS Midway
SPARTAN	USS Lexington CVT-16
STONEWALL	CINCPAC
STRONGBOX	Naval network call designator
SWORDFISH	USCG Aircraft 01
TOPHAND	Submarine command Atlantic, Norfolk
TORREADOR	NAVCOMSTA San Francisco, California
YELLOW BLOOD	HQ Fleet Marine Force, Pacific

U.S. Navy Convoy Voice Call Signs

Convoy internal call signs are used only between ships within a convoy, the escort force and supporting aircraft on short range communications channels. They are never used when communicating with shore stations or for contacting other forces.

Ships or Authorities	Call Sign
Commodore	CHIEF
Vice Commodore	LUCK
Convoy Collective	TEAM
Commodore's section	VAMP
Vice Commodore's section	MERGE
Rear Commodore	CASEMATE
Rear Commodore's section	SWAP
Escort force commander	BOSS
Individual ships in convoy	DELTA + position no.
Escort ships, collective	GANG
Escort ships, individual	BIT + hull no.
Patrol/support group commander	FOREMAN
Patrol/support group collective	MOB
Escort carrier No. 1	NEST
Escort carrier No. 2	COTE
Escort carrier No. 3	STARCAST
Escort carrier No. 4	SACK
Rescue ships	STRETCHERS
HF DF ships	DUFFER
MF DF ships	METER
Ships operating aircraft	HAWKER
Ships in or near the van	VAN
Ships in or near the center	MID
Ships in or near the rear	REAR
AA cruiser(s)	CRACKER
Ship controlling aircraft	EAGLE
Even numbered ships	ROMP
Odd numbered ships	TAX
Leading ships of columns	CANDY
Leading ships on the port side	BRIDEWELL
Leading ships on starboard side	PAGE
Rear ships on the port side	SODA
Rear ships of columns	SPRINT
Rear ships on the starboard side	ROLL
Even numbered columns	BLIGHT
Odd numbered columns	MIXED
Columns on the port side	SHIRT
Columns on the starboard side	PUPPY
Screen commander	COMMANDER
Escorting aircraft	ALFA

U.S. Navy Base Net - USB

Call Sign "Dude Ranch"
Newport, RI to Bath, ME

International Voice Call Signs

MAYDAY	Distress signal (SOS)
SECURITY	Safety signal
PAN	Urgent signal

U.S. Navy Encrypted RTTY

Cutler, Maine

(50 baud, 71.4 wpm/850 Hz shift)
Simulkey: 7455 10130 11689

South Pacific - Joint Military Emergency Disaster Net

GUAM (USB)
4040 Pri 4813.5 Sec

Radiotelephone Net (USB)

San Diego, CA
U.S. Navy Ship/Shore
Command Switching System (CSS)

Ch	Duplex Freq
CSS1	4066.1/4360.5
CSS2	8247.7/8771.6

Norfolk, VA U.S. Navy Ship/Shore Intercommand Switchboard (ICSB)

Duplex Freq
4066.1/4360.0

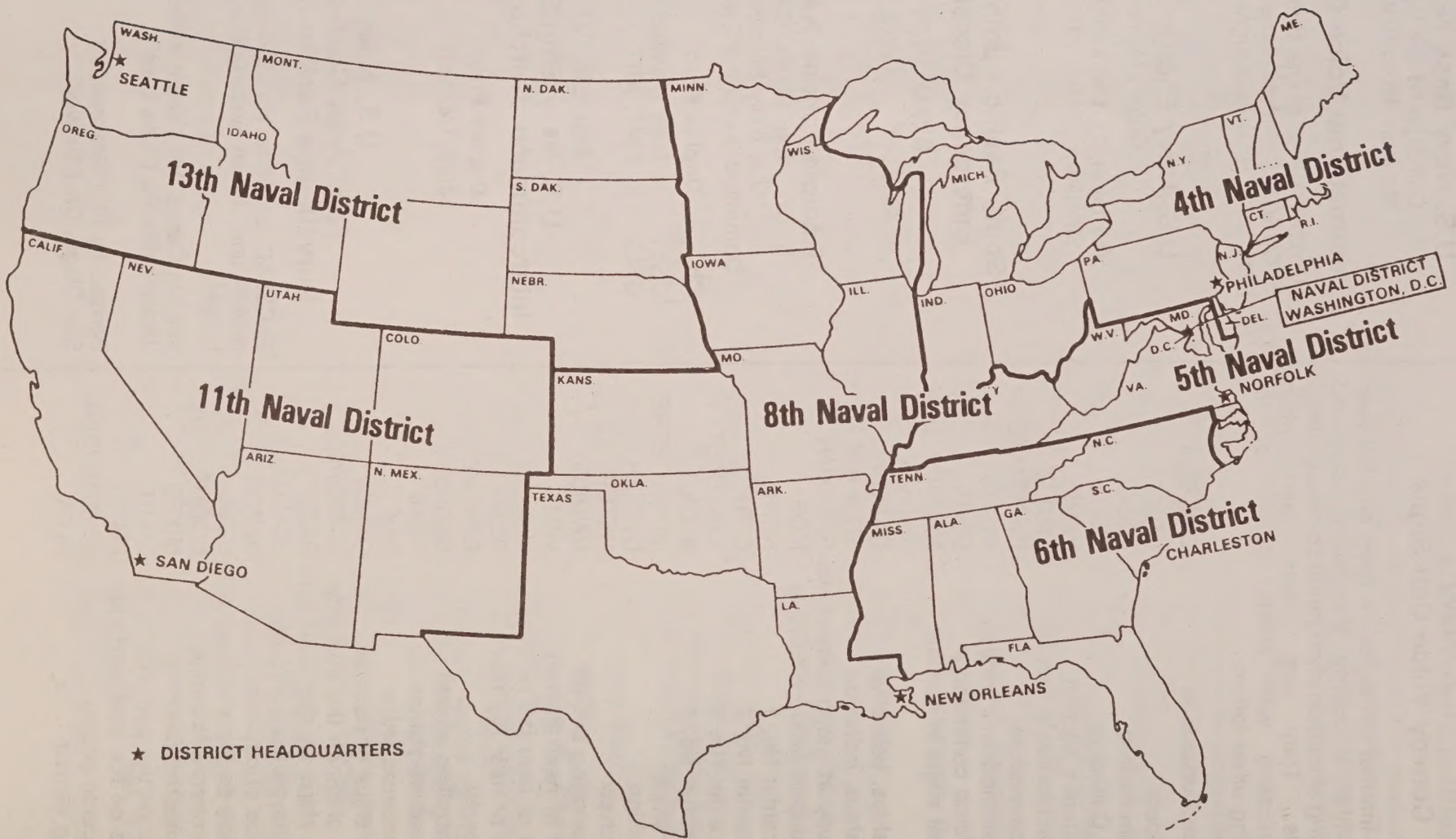
U.S. Navy Fleet Area Control and Surveillance Facility (FACSFAC)

FACSFAC provides communications support to military and civilian aircraft off U.S. coastlines and Hawaii.

Virginia Capes, VA ("Giant Killer")	2252 4373
Jacksonville, FL ("Sea Lord")	3130 6723 6742 11252
Pensacola, FL ("Seabreeze")	6835
San Diego, CA ("Beaver")	6723

U.S. NAVAL DISTRICTS

WITHIN THE CONTERMINOUS UNITED STATES



11th and 13th Naval Districts;
Responsibility of CINCPACFLT

4th, 5th, 6th, 8th and NDW Washington;
Responsibility of CINCLANTFLT

U.S. Navy Antarctic Stations

U.S. Navy Support Force ("Operation Deep Freeze")

Station	Callsign	Mars Call	Ham Call
McMurdo	NGD	NNN0NBG	KC4USV
South Pole	NPX	NNN0 ?	KC4AAA
Palmer	PHG	NNN0NPA	KC4AAC
Siple	NQU	NNN0 ?	C4AAD
Williams Field	NZCM	NNN0 ?	KC4USX
Byrd Surface Camp	NBY	NNN0 ?	KC4USB
Dome Charlie			KC4AAK

Net No.

Harbor Common (McMurdo, Ships & Heli Control): 2716

US-3 Ship Tactical (Used by ships once under way): 2025 3237

US-4 Ships Conference (Long Range Ship Communications): 3319 8294.2 12429.2

US-5 Long Range Air/Ground Communications: 8997 Pri/ 13251 Sec

US-5 Alternate Air/Ground Communications (SSB): 4718 5726 6708 11255

US-9 Air to Ship: 3102 5696
Forecaster to Pilot: 13251

US-14 Antarctic Broadcasts FAX & RTTY: 2650 4873 5810 6397 8090 11104 17361.5
Antarctic RTTY Working: 7340 7750 9073 9830 10235 12029 12280 13545 13551.5 15564

US-17 Antarctic Common (Field Party to Base): 2830 4768 7993 8974 11553
McMurdo to Christchurch, NZ (PTP):

Call	Freq	Call	Freq
ZLK28	17450	ZLK36	16152
ZLK32	14768	ZLK37	21804
ZLK34	9785	ZLK42	11580
ZLK35	11460	ZLK46	14700

Others include:
5080 7540 7929.5 9215 17403 21834 22842.5

Antarctic MARS Frequencies

Modes: USB or RTTY (75 baud/170 Hz shift)

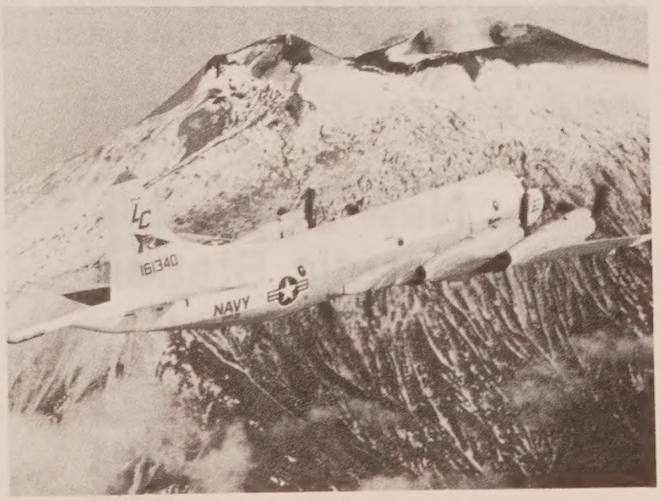
6970 7365 7370 7393 13826 13974 14470 14761.5

Australian Antarctic Stations

Station	Official Call Sign
Mawson Base	VLV
Casey Base	VNJ
Davis Base	VLJ
Moore Pyramid Base(Summer)	VLV3
Mt. Cresswell Base(Summer)	
MacQuarie Island	VJM
Wilkes Base (Closed)	VLL

Frequencies

Station to Station	4040 6850 7922 9940 12255 14415 15845
Field Parties	2720 4040 5400 8110
Aircraft	6610 8938 3023.5
Additional	7924 12215 12255
VNM Melbourne to Antarctic	9941.5 12256.5 14415 15846 19256.6 17481.5



Belgian Antarctic Station

Roi Baudouin Base Callsign: ORU

Callsign	Frequency
ORU27	7750
ORU20	9272
ORU30	10649
ORU32	12152
ORU50	20975
ORU42	22960

6765 Belgian Air Force Kokside Rescue

French Antarctic Station

RTTY

Dumond d'Urville (Terre Adelie)
Callsign: FJY3

5450 7420 9268 9788 10113 11575 11985 14670 14940 16050 17548 17695 20240 21845 23490 23985 24060 24460

Amsterdam Is. Callsign: FJY4
Frequency: 8960

Japanese Antarctic Base

Syowa Base Callsign: JGX

Frequencies:

2050 2570 3025 3170 3195 4540 4575 5490 5947 7771 8161 8186 8364 11532.5 11565 14450 14570 14895 18505 18675 20265 20475

Aircraft: 3035 4540 7771 5940 8186

New Zealand Antarctic Station

Station	Callsign	Freq USB
Vanda Station	ZLEM	
Scott Base	ZLQ	5400
	ZLQ5	5785
	ZLQ6	7490
(Channel #1 2773 #2 5400 #3 6708 #4 8997)	ZLQ7	10760
	ZLQ8	14655
	ZLQ9	19250
	ZLQ24	11570
	ZLQ25	10550
	ZLQ26	10688
	ZLQ27	14580
	ZLQ29	9435

Norwegian Antarctic Station

Frei Base Callsign: LFB

5302 6600 8510 11602.5 FAX
11660 12850 14470 15470

South African Antarctic Station

Frequencies:

3737 4040 6274 6780 8264 9843 11145 12442 13560 14445 14495 16471 16510 17348 19083 22085

Emergency: 2006 3250 3390 3567 3800 6780 7047

United Kingdom Antarctic Stations

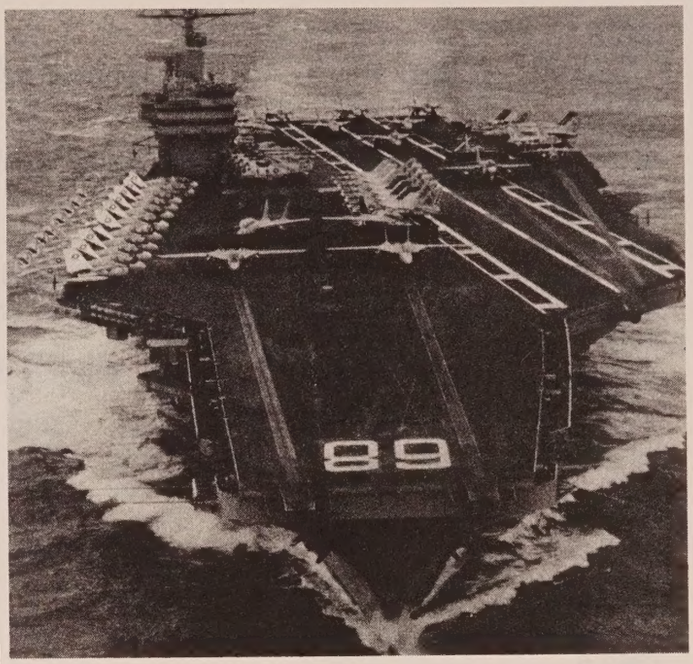
(11255 Pri. USB; 9106 Sec. USB)

Station	Callsign	Freq.
Signey, South Orkney IS.	ZHF33	9106
		4067
Faraday, Graham Land	ZHF44	9106
Rothera, Adelaide Is.	ZHF45	11255
Grytviken, South Georgia Is.	ZBH	9106
Port Stanley, Falkland Is.	ZHF88	8150
		9100
		12300 (RTTY)
Halley Bay (Base Z)	VSD	3186
		7623
		9106
		12530
Bird Is., South Georgia Is.	ZBH22	
Base Common		9106
		11255
Aircraft:		4067

U.S.S.R. Antarctic Stations

(CW/RTTY)

Station	Callsign	Freq
Bellingshausen Base	UGE2	4106
		8102
		10100
		10140
		10555
		13385
		13715
Mirnyj Base	UFE	7665
		7765
		9215
		13385
Molodezhnaya Base	RUZU	4010
		7595
		8102
		9280
		9325
		10100
		10140
		10350
		12843
		13385
		13715
		13905
		14375
		14558
Novolazerevskaya Base	UDY	13385
Vostok Station	RULE	13385
Russkay Station	UDR3	13715
Leningradskya	UMA4	
Other Frequencies Reported		12570
		12575
		12793
		13505
		15830
		22340
Shore:		12843
Ship:		12571.5



Navy/Marine Corps MARS

Frequency	Region
2025.0	
2026.5	
'2049.5	
2150.0	
2470.0	
2576.0	
2656.0	
2820.0	
3190.5	
3192.5	
3319.0	
3322.0	
3350.5	
3391.5	
4001.0	
4001.5	
4005.0	
4007.0	1-2-3-5-7-HI-GUM
4008.5	
4010.0	
4011.0	
4012.5	
4013.5	1-2-4-PR
4015.0	
4016.5	
4040.0	
4041.0	1-4
4042.5	
4045.0	
4470.5	5-7-HI-PHL
4472.0	
4515.0	
4625.0	

NAVY

4803.5	
4805.5	
4820.0	J-GUM
4826.5	
5155.0	
5159.5	ALL-HI
5797.5	
5865.0	
6878.5	
6880.0	
6968.5	
6970.0	
7301.5	5-7-HI
7346.5	
7350.0	
7360.0	J
7365.0	1-2-4-5-PR
7367.5	
7370.0	ALL-HI
7372.5	
7375.0	
7380.0	
7382.5	
7385.0	
7387.5	
7393.0	ALL-HI
7495.0	ALL-HI-J-PHL-GUM
7500.0	
7353.0	
7685.5	1-2-4-5-7
7992.5	
8033.0	5-7-HI
8150.0	
9052.0	
9210.0	
10255.0	
10259.5	
11401.0	
11402.5	
11538.0	ALL-PR
11539.0	4-7
11539.5	HI-PAN
11540.0	5
11655.0	J
12049.0	5-7-HI
12124.0	1-2-3-4
12127.5	
12223.5	
13380.0	1-2-3-4
13485.0	5-7-HI-J-GUM
13530.0	1-2-3-4
13540.0	1-2-3-4
13643.0	ALL-HI-PHL-GUM
13644.5	
13827.5	ALL-HI-J-GUM
13927.5	
13974.0	ALL-PR-HI
13975.5	
14385.0	ALL-PR-HI-J-PHL-GUM
14393.0	
14441.5	ALL
14443.0	
14467.0	1-2-4
14468.5	
14470.0	
14471.5	1-2-4
14477.0	1-2-4
14478.5	
14480.0	
14483.5	1-2-3-4
14485.0	
14761.5	
14820.0	5-7-HI-PHL-GUM
14840.0	1-2-3-4
14935.5	ALL-HI
15498.5	
16057.5	
16174.5	
16300.0	ALL-PR-HI-J
16387.5	1-2-3-4
19187.5	5-7-HI-J-PHL-GUM
19430.0	
19671.5	
19882.0	
19918.5	
19956.5	
20375.0	
20525.0	
20580.0	
20625.0	
20680.0	ALL-HI-GUM
20937.5	ALL-PR-HI
20988.5	1-2-4
20998.5	ALL-PR-HI
23355.0	
24170.0	
24266.5	
24350.0	
26877.5	
27900.0	
27950.0	
27963.5	5-7-HI
27975.5	5-7-HI

USN/USMC MARS Regions

1	ME, NH, VT, CT, MA, RI, DE NJ, NY, PA, OH
2	DC, MD, VA, WV, KY, NC SC, GA, FL, TN, AL, MP, CARIBBEAN, EUROPE, MEDITERRANEAN, ATLANTIC, ICELAND, ANTARTIC
3	LA, AR, OK, TX, NM, PANAMA
4	MI, IN, IL, WI, MN, IA, MO, ND, SD, NE, KS, CO, WY
5	AZ, NV, CA, UH
6	(NONE)
7	WA, OR, MT, ID, AK
8	HI, PACIFIC, INDIAN OCEAN

Call Sign Procedure

NNN0C--: Navy or Coast Guard ship
NNN0M--: Marine Corps land station (NNN0MCL Camp Le Jeune, NC)
NNN0N--: Naval base or ship

MARS Afloat Specialty Net

(All call signs begin NNN0 and all ships begin USS unless otherwise noted)

Key to Ship Type

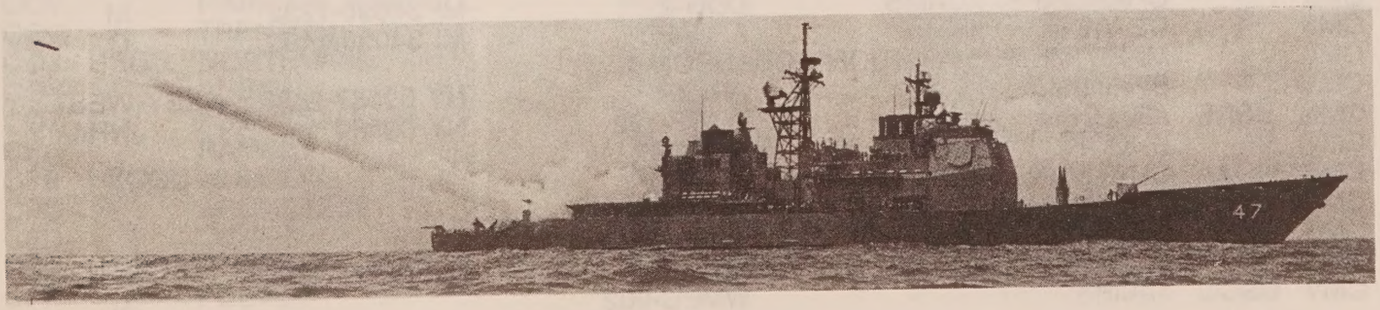
AE	Ammunition ship
AFS	Combat stores ship
AGF	Miscellaneous command (flag) ship
AGSS	Auxiliary research submarine
AO	Fleet oiler
AOE	Fast combat support ship
AOR	Replenishment fleet tanker
AR	Repair ship
ARL	Repair ship, landing craft
ARS	Salvage ship
AS	Submarine tender
ASR	Submarine rescue ship
ATS	Salvage and rescue ship
BB	Battleship
CG	Guided missile cruiser
CGN	Guided misile cruiser (nuclear)
CV	Attack aircraft carrier
CVN	Aircraft carrier (nuclear)
DD	Destroyer
DDG	Guided missile destroyer
FF	Frigate
FFG	Guided missile frigate
LCC	Amphibious command ship
LKA	Amphibious cargo ship
LPD	Amphibious transport dock
LSD	Landing ship, dock
LST	Landing ship, tank
SSN	Submarine (nuclear)
T-AF	Store ship (MSC operated)
T-AFS	Combat stores ship (MSC operated)
T-AGS	Oceanographic surveying ship (MSC operated)
T-AO	Fleet oiler (MSC operated)
T-ATF	Ocean tug fleet (MSC operated)

Key to Homeports

A	Alameda, CA
C	Charleston, SC
CON	Concord, CA
E	Weapons Station, Earle, NJ
G	Groton, CT
GA	Gaeta, Italy
GM	Guam
LB	Long Beach, CA
LC	Little Creek, Norfolk, VA
M	Mayport, FL
N	Norfolk, VA
NHA	No homeport assigned
NT	Newport, RI
O	Oakland, CA
PA	Philadelphia, PA
PE	Pensacola, FL
PH	Pearl Harbor, HI
SB	Subic Bay, Philippines
SD	San Diego, CA
SO	Sajebo, Japan
WSC	Weapons Station Charleston, SC
Y	Yokosuka, Japan

FPO Address

SE	Seattle, Washington
SF	San Francisco
MI	Miami, Florida
NY	New York, New York



NAVY

Call		Ship	Type/Hull #	FPO Address	Homeport
BLU		BLUE RIDGE	LCC-19	SF 96628-3300	Y
CAA		NEWPORT	LST-1179	NY 09579-1800	SF
CAB		MC KEE	AS-41	SF 96621-2620	SD
CAC		MOBILE BAY	CG-53	MI 34092-1173	M
CAE		TAYLOR	FFG-50	MI 34093-1504	C
CAG		MC ARTHUR	S-330		
CAI		ANTIETAM	CG-54	SF 96660-1174	LB
CAK		UNDERWOOD	FFG-36	MI 34093-1491	M
CAL		ANCHORAGE	LSD-36	SF 96660-1724	LB
CAM	USNS	JOHN LENTHALL	T-AO-189	NY 09587	NHA
CBC	NOAAS	MILLER FREEMAN	R-223		
CBD		THOMAS S. GATES	CG-51	NY 09570-1171	N
CBE		LEYTE GULF	CG-55	MI 34091-1175	M
CBF		HAWES	FFG-53	MI 34091-1507	C
CBG		SAMUEL B. ROBERTS	FFG-58	NY 09586-1512	NT
CBH		BUNKER HILL	CG-52	SF 96661-1172	SD
CBQ		SIMPSON	FFG-56	NY 09587-1510	NT
CBR		HALYBURTON	FFG-40	MI 34091-1495	C
CCE	NOAA	DAVID STARR JORDAN	R-444		
CCG		CONQUEST	MSO-448	SE 98799-1915	SE
CFB		FORD	FFG-54	SF 96665-1508	LB
CGA		PIGEON	ASR-21	SF 96675-3211	LB
CGH		BUCHANON	DDG-14	SF 96661-1244	SD
CGR	USNS	NARRAGANSETT	T-ATF-167	SF 96673-4048	NHA
CHB		WICHITA	AOR-1	SF 96683-3023	O
CHG		GARY	FFG-51	SF 96666-1505	LB
CHL		SHASTA	AE-33	SF 96678-3009	CON
CHS		VINCENNES	CG-49	SF 96682-1169	SD
CIC*		SCHOFIELD	FFG-3	SF 96678-1461	SD
CIL		MARITIME PREPOSITION SQUADRON 2			
CJB		ROANOKE	AOR-7	SF 96677-3029	LB
CJH		THACH	FFG-43	SF 96679-1498	SD
CJL		JARRETT	FFG-33	SF 96669-1489	LB
CJN		REID	FFG-30	SF 96677-1486	SD
CKK		MISSOURI	BB-63	SF 99689-1120	LB
CKO		COOK	FF-1083	SF 96662-1443	SD
CLB		LONG BEACH	CGN-9	SF 96671-1160	SD
CLF		VALLEY FORGE	CG-50	SF 96682-1170	SD
CLL		O'CALLAHAN	FF-1051	SF 96674-1411	SD
CLN		ALAMO	LSD-33	SF 96660-1721	SD
CLT		ELLIOT	DD-967	SF 96664-1205	SD
CMA		JOHN L. HALL	FFG-32	MI 34091-1488	C
CMB		TRUETT	FF-1095	NY 09588-1455	N
CMC		AUBREY FITCH	FFG-34	MI 34091-1490	M
CMD		IOWA	BB-61	NY 09546-1100	N
CME	USCG	NORTHLAND	WMEC-904		N
CMF		JOHN KING	DDG-3	NY 09576-1233	N
CMG		FLATLEY	FFG-21	MI 34091-1477	M
CMH		MC CLOY	FF-1038	NY 09578-1401	N
CMI		ROBERT G. BRADLEY	FFG-49	MI 34090-1503	C
CMJ		CHARLES F. ADAMS	DDG-2	MI 34090-1232	M
CMK		DE WERT	FFG-45	MI 34090-1499	C
CML		MARITIME PREPOSITION SQUADRON 1			
CMM		SPHINX	ARL-24	NY 09587-2625	KEY WEST
CMN	USNS	APACHE	T-ATF-172	NY 09564	NHA
CMO		SNOOK	SSN-592		
CMP	NOAA	CHAPMAN			
CMQ	USCG	ALERT	WMEC-630		
CMS	USCG	COURAGEOUS	WMEC-622		
CMU		SEATTLE	AOE-3	NY 09587-3014	N
CMV	USCG	TAMPA	WMEC-902		N

CMW		GRAPPLE	ARS-53	NY 09570-3223	LC
CMX	USNS	HENRY J. KAISER	T-AO-187	NY 09576-4086	N
CMY	USNS	SATURN	T-AFS-10	NY 09587-4052	NHA
CMZ	USNS	PAWCATUCK	T-AO-108	09582-4045	NHA
CNA		TRIPOLI	LPH-10	SF 96626-1645	SD
CNB		JUNEAU	LPD-10	SF 96669-1713	SD
CNC		PAUL F. FOSTER	DD-964	SF 96665-1202	LB
CND		JOSEPH STRAUSS	DDG-16	SF 96678-1246	PH
CNE		ENGLAND	CG-22	SF 96664-1146	SD
CNF		FORT FISHER	LSD-40	SF 96665-1728	SD
CNG		BRISTOL COUNTY	LST-1198	SF 96661-1819	SD
CNH		NEW JERSEY	BB-62	SF 96688-1110	LB
CNI		DOLPHIN	AGSS-555	SF 96663-3400	SD
CNJ		CARON	DD-970	NY 0956-1208	N
CNK	USNS	HASSAYAMPA	T-AO-145	SF 96667	NHA
CNL		WORDEN	CG-18	SF 96683-1142	PH
CNM		CLEVELAND	LPD-7	SF 96662-1710	SD
CNN*		ALBERT DAVID	FF-1050	SF 96663-1410	SD
CNO		REASONER	FF-1063	SF 96677-1423	SD
CNP		BAINBRIDGE	CGN-25	NY 09565-1161	N
CNQ*	USNS	HITCHITI			
CNR	USCGC	MIDGETT	WHEC-726		
CNS	NOAAS	RAINIER S221	MSS-21		
CNT*	USNS	ATAKAPA			
CNU		PYRO	AE-22	SF 96675-3003	CON
CNV		FREDERICK	LST-1184	SF 96665-1805	SD
CNW		CHARLESTON	LKA-113	NY 09566-1700	N
CNX		VIRGINIA	CGN-38	NY 09590-1165	N
CNY		GLOVER	FF-1098	NY 09570-1458	N
CNZ		WILLIAM V. PRATT	DDG-44	MI 34092-1262	C
COA		RALEIGH	LPD-1	NY 09586-1705	N
COB*		MULLINNIX			
COC		SACRAMENTO	AOE-1	SF 96678-3012	A
COD		DEWEY	DDG-45	MI 34090-1263	C
COE		INDEPENDENCE	CV-62	NY 09537-2760	N
COF		PATTERSON	FF-1061	NY 09582-1421	P
COG		ENTERPRISE	CVN-65	SF 96636-2810	A
COH		CAPE COD	AD-43	SF 96649-2535	SD
COI		RECLAIMER	PH	SF 96677-3205	PH
COJ		BOWEN	FF-1079	NY 09565-1439	PH
COK		MARS	AFS-1	SF 96672-3030	O
COL	USNS	TRUCKEE	T-AO-147	NY 04586	NHA
COM*		POINT DEFIANCE			
CON*		DUPONT			
COO		TATTNALL	DDG-19	MI 34093-1249	M
COP		SCAMP	SSN-588		G
COQ		PENSACOLA	LSD-38	NY 09582-1726	LC
COR		HUNLEY	AS-31	NY 09559-2580	N
COS		W.S.SIMS	FF-1059	MI 34093-1419	M
COT		FAIRFAX COUNTY	LST-1193	NY 09569-1814	LC
COU		SARATOGA	CV-60	MI 34093-1419	M
COV		HARRY E. YARNELL	CG-17	NY 09594-1141	N
COW		TRENTON	LPD-14	NY 09588-1716	N
COX	USCG	NORTHWIND	WAGB-282		
COY		AUSTIN	LPD-4	NY 09564-1707	N
COZ		FORRESTAL	CV-59	MI 34080-2730	M
CPA*		RAMSEY	FFG-2	SF 96677-1460	SD
CPB	USCGC	MUNRO	WHEC-724		
CPC		BRONSTEIN	FF-1037	SF 96661-1400	SD
CPD		OGDEN	LPD-5	SF 96674-1708	SB
CPE	USCGC	RUSH	WHEC-723		
CPF		PEORIA	LST-1183	SF 96675-1804	SD

NAVY

CPG*		JOHN PAUL JONES	DDG-53		
CPH	USCGC	BASSWOOD	WAGL-388		
CPI		LEAHY	CG-16	SF 96671-1140	LB
CPJ		ROBISON	DDG 12	SF 96677-1242	SD
CPK		HORNE	CG-30	SF 96667-1153	SD
CPL		KISKA	AE-35	SF 96670-3011	CON
CPM		TRUXTON	CGN-35	SF 96679-1162	SD
CPN		KANSAS CITY	AOR-3	SF 96670-3025	O
CPO		MERRILL	DD-976	SF 96672-1214	SD
CPP		OKINAWA	LPH-3	SF 96625-1630	SD
CPQ		LOCKWOOD	FF-1064	SF 96671-1424	Y
CPR		HOEL	DDG-13	SF 96667-1243	SD
CPS		JOHN A. MOORE	FFG-19	SF 96672-1475	LB
CPT		HECTOR	AR-7		
CPU	USCGC	YOCONA			
CPV		KINKAID	DD-965	SF 96670-1203	SD
CPW		JOHN YOUNG	DD-973	SF 96686-1211	SD
CPX		DURHAM	LKA-114	SF 96663-1701	SD
CPY		SCHENECTADY	LST-1185	SF 96678-1806	SD
CPZ		BENJAMIN STODDERT	DDG-22	SF 96678-1252	SD
CQA		ROARK	FF-1053	SF 96677-1413	SF
CQB		HEWITT	DD-966	SF 96670-1203	SD
CQC		BEAUFORT	ATS-2	SF 96670-1203	SD
CQD	USCGC	JARVIS	WHEC-725		
CQE		WABASH	AOR-5	SF 96683-3027	LB
CQF*		SOMERS			
CQG	USNS	CHAUVENET	T-AGS-29	SF 96662-7104	NHA
CQH		PROTEUS	AS-19	SF 96646-2575	GM
CQI*		BRADLEY	FF-1041	SF 96661-1403	SD
CQJ		DUBUQUE	LPD-8	SF 96663-1711	SO
CQK		COCHRANE	DDG-21	SF 96662-1251	Y
CQL		LYNDE MCCORMICK	DDG-8	SF 96672-1238	SD
CQM		FRESNO	LST-1182	SF 96665-1803	LB
CQN		STERETT	CG-31	SF 96678-1154	SB
CQO		WADDELL	DDG-24	SF 96683-1254	SD
CQP		MOUNT HOOD	AE-29	SF 96672-3007	CON
CQQ		MIDWAY	CV-41	SF 96631-2710	Y
CQR		DOWNES	FF-1070	SF 96663-1430	SD
CQS		BREWTON	FF-1086	SF 96661-1446	PH
CQT	USCGC	IRONWOOD	WLB-297		
CQU		BONEFISH	SS-582		
CQV	NOAA	OCEANOGRAPHER	R-101		
CQW		WHITE PLAINS	AFS-4	SF 96683-3033	GM
CQX		RATHBURNE	FF-1057	SF 96677-1417	PH
CQY		ROBERT E. PEARY	FF-1073	SF 96675-1433	PH
CQZ		TUSCALOOSA	LST-1187	SF 96679-1808	SD
CRA*	USNS	MOSOPELA			
CRB		DETROIT	AOE-4	NY 09567-3015	N
CRC		SIERRA	AD-18	MI 34084-2505	C
CRD		MOINESTER	FF-1097	NY 09578-1457	N
CRE		BOULDER	LST-1190	NY 09565-1811	LC
CRF*		NAUTILUS			
CRG		STUMP	DD-978	NY 09587-1216	N
CRH		MANITOWOC	LST-1180	NY 09578-1801	LC
CRI		SCULPIN	SSN-590	NY 09587-2307	G
CRJ*		TALBOT	FFG-4	MI 34093-1462	M
CRK		PONCE	LPD-15	NY 09582-1717	N
CRL		CORONADO	AGF-11	SF 96662-3330	PH

CRM	JOSEPH HEWES	FF-1078	MI 34092-1438	C
CRN* USCGC	ACUSHNET			
CRP*	EDWARD MCDONNELL	FF-1043	MI 34092-1404	M
CRQ	LEADER	MSO-490	MI 34091-1917	C
CRR*	BLANDY			
CRS USCGC	TANEY	WHEC-37		
CRT	SKIPJACK	SSN-585	NY 09587-2305	G
CRU*	PLYMOUTH ROCK			
CRV	MACDONOUGH	DDG-39	MI 34092-1257	C
CRW	GUAM	LPH-9	NY 09563-1640	N
CRX	PAUL	FF-1080	MI 34092-1440	M
CRY	RICHARD L. PAGE	FFG-5	NY 09582-1463	N
CRZ	AMERICA	CV-66	NY 09531-2790	N
CSA	LAWRENCE	DDG-4	NY 09577-1234	N
CSB	SPARTANBURG COUNTY	LST-1192	NY 09587-1813	LC
CSC	ORION	AS-18	NY 09513-2570	LM
CSD	SPIEGEL GROVE	LSD-32	NY 09587-1720	LC
CSE	ELMER MONTGOMERY	FF-1082	MI 34092-1442	M
CSF	SOUTH CAROLINA	CGN-37	NY 09587-1164	N
CSG*	NEWMAN K.PERRY			
CSH*	MANLEY			
CSI	CONNOLE	FF-1056	NY 09566-1416	NT
CSJ	COONTZ	DDG-40	NY 09566-1258	N
CSK	BARNSTABLE COUNTY	LST 1197	NY 09565-1818	LC
CSL	DALE	CG-19	MI 34090-1143	PA
CSM*	DYESS			
CSN	MOOSBRUGGER	DD-980	MI 34092-1218	C
CSO*	GARCIA	FF-1040	MI 34091-1402	C
CSP	TRIPPE	FF-1075	MI 34093-1435	NT
CSQ	LA MOURE COUNTY	LST-1194	NY 09577-1815	LC
CSS	JESSE L.BROWN	FF 1089	MI 34090-1449	C
CST USCGC	DECISIVE	WMEC-629		
CSU	SAN DIEGO	AFS-6	NY 09587-3035	N
CSV*	BARRY	DDG-52		
CSW	SAIPAN	LHA-2	NY 09549-1605	N
CSX	KING	DDG-41	NY 09576-1259	N
CSY	SAMPSON	DDG-10	MI 34093-1240	M
CSZ*	JULIUS A.FURER	FFG-6	MI 34091-1464	PA
CTA	STEIN	FF-1065	SF 96678-1425	SD
CTB USCGC	VENTUROUS	WMEC-625		
CTC USCGC	POLAR SEA	WAG-11		
CTD	HENRY B.WILSON	DDG-7	SF 96683-1237	SD
CTE	FLORIKAN	ASR-9	SF 96665-3207	PH
CTF	DAVID R.RAY	DD-971	SF 96677-1209	SD
CTG	BERKELEY	DDG-15	SF 96661-1245	SD
CTH	RANGER	CV-61	SF 96633-2750	SD
CTI	HALSEY	CG-23	SF 96667-1147	SD
CTJ	TARAWA	LHA-1	SF 96622-1600	LB
CTK	BOLSTER	ARS-38		
CTL	MAUNA KEA	AE-22	SF 96672-3001	CON
CTM	REEVES	CG-24	SF 96677-1148	Y

NAVY

CTN		BARBEY	FF-1088	SF 96661-1448	SD
CTO		VANCOUVER	LPD-2	SF 96682-1706	SD
CTP	NOAAS	DISCOVER	R-102		
CTQ		O'BRIEN	DD-975	SF 96674-1213	SD
CTR	NOAAS	SURVEYOR	S-132		
CTS		OLDENDORF	DD-972	SF 96674-1210	Y
CTT	USNS	JUPITER	T-AKR-11	SF 96601	NHA
CTU		AJAX	AR-6	SF 96642-2550	
CTV		JASON	AR-8	SF 96644-2560	SD
CTW		BARBOUR COUNTY	LST-1195	SF 96661-1816	SD
CTX		DIXON	AS-37	SF 96648-2605	SD
CTY		FOX	CG-33	SF 96665-1156	SD
CTZ		BELLEAU WOOD	LHA-3	SF 96623-1610	SD
CUA		AYLWIN	FF-1081	MI 34090-1441	NT
CUB		ARTHUR W.RADFORD	DD-968	NY 09586-1206	N
CUC*		FORREST SHERMAN			
CUD		CLAUDE V.RICKETTS	DDG-5	NY 09586-1235	N
CUE		AINSWORTH	FF-1090	NY 09564-1450	N
CUF		MCCANDLESS	FF-1084	NY 09578-1444	N
CUG		TEXAS	CGN-39	SF 96679-1166	A
CUH		PETERSON	DD-969	NY 09582-1207	N
CUI		HERMITAGE	LSD-34	NY 09548-2545	LC
CUJ		VULCAN	AR-5	NY 09548-2545	N
CUK		VALDEZ	FF-1096	NY 09590-1456	NT
CUL		SEMMES	DDG-18	MI 34093-1248	C
CUM	USCGC	CAPE SHOALWATER	WPB-95324		
CUN		MILLER	FF-1091	NY 09578-1451	NT
CUO		SPRUANCE	DD-963	NY 09587-1201	NT
CUP		NIMITZ	CVN-68	SE 98780-2820	
CUQ		FRANK CABLE	AS-40	MI 34086-2615	C
CUR		SAVANNAH	AOR-4	NY 09587-3026	N
CUS		INCHON	LPH-12	NY 09529-1655	N
CUT		NITRO	AE-23	NY 09579-3001	E
CUU	USCGC	ACTIVE	WMEC-218		
CUV		COMTE DE GRASSE	DD-974	NY 09566-1212	N
CUW*		FISKE			
CUX		NASSAU	LAH-4	NY 09557-1615	N
CUZ		PUGET SOUND	AD-38	NY 09544-2520	N
CVA		BELKNAP	CG-26	NY 09565-1261	GA
CVB		DAHLGREN	DDG-43	NY 09567-1261	N
CVC		KALAMAZOO	AOR-6	NY 09576-3028	N
CVD		SANTA BARBARA	AE-28	MI 34093-3006	WSC
CVE*		WELCH			
CVF		RICHMOND K.TURNER	CG-20	MI 34093-1144	C
CVG		DWIGHT D.EISENHOWER	CVN-69	NY 09532-2830	N
CVH		MOUNT BAKER	AE-34	MI 34093-3010	WSC
CVI		HARLAN COUNTY	LST-1196	NY 09573-1817	LC
CVJ		L.Y.SPEAR	AS-36	NY 09547-2600	N
CVK		NASHVILLE	LPD-13	NY 09579-1715	N
CVL		SHREVEPORT	LPD-12	NY 09587-1714	N
CVM		FARRAGUT	DDG-37	NY 09569-1255	N
CVN		BRISCOE	DD-977	NY 09565-1215	N
CVO		GUADALCANAL	LPH-7	NY 09562-1635	N
CVP		CONOLLY	DD-979	NY 09566-1217	N
CVQ*		VOGE	FF-1047	MI 34093-1407	M
CVR	USGCC	RELIANCE	WMEC-615		

CVS		MISSISSIPPI	CGN-40	NY 09578-1167	N
CVT		OLIVER HAZARD PERRY	FFG-7	NY 09582-1465	PA
CVU		SAGINAW	LST-1186	NY 09587-1809	LC
CVV		YELLOWSTONE	AD-41	NY 09512-2525	N
CVW		EMORY S.LAND	AS-39	NY 09545-26120	N
CVX		EL PASO	LKA-117	NY 09568-1704	N
CVY	USNS	RIGEL	T-AF-58	NY 09586-	NHA
CVZ		MOUNT WHITNEY	LCC-20	NY 09517-3310	N
CWA		PRAIRIE	AD-15	SF 96639-2500	LB
CWB		NIAGARA FALLS	AFS-3	SF 96673-3032	GM
CWC		SAMUEL GOMPERS	AD-37	SF 96641-2515	A
CWD		W.H. STANDLEY	CG-32	SF 96678-1155	SD
CWE		INGERSOLL	DD-990	SF 96668-1228	PH
CWF	USCGC	CAPE SMALL	WPB-95300		
CWG		PELELIU	LHA-5	SF 96624-1620	LB
CWH		ST. LOUIS	LKA-116	SF 96678-1703	SO
CWI		WISCONSIN	BB-64		
CWJ		HAROLD E.HOLT	FF-1074	SF 96667-1434	PH
CWK*		BROOKE	FFG-1	SF 96661-1459	SD
CWL		CALLAGHAN	DDG-994	SF 96662-1266	SD
CWM		WHIPPLE	FF-1062	SF 96633-1422	PH
CWN		DULUTH	LPD-6	SF 96663-1709	SD
CWO		FLINT	AE-32	SF 96663-3008	CON
CWP		FIFE	DD-991	SF 96665-1229	SD
CWQ*		PARSONS			
CWR		SAN BERNARDINO	LST-1189	SF 96678-1810	SO
CWS		GOLDSBOROUGH	DDG-20	SF 9666-1250	PH
CWT		CHANDLER	DDG-996	SF 96662-1268	SD
CWU	USCGC	SASSAFRAS	WLB-401		
CWV		POINT LOMA	AGDS-2	SF 96675-3406	SD
CWW		FANNING	FF-1076	SF 96675-3406	SD
CWX		ACADIA	AD-42	SF 96665-1436	SD
CWY		CARL VINSON	CVN-70	SF 96629-2840	A
CWZ		GRIDLEY	CG-21	SF 9666-1145	SD
CXA		PREBLE	DDG-46	NY 09582-1264	N
CXB		JOHN F.KENNEDY	CV-67	NY 09538-2800	N
CXC		DOYLE	FFG-39	MI 34090-1494	M
CXD		JOHN RODGERS	DD-983	MI 34092-1221	C
CXE		NICHOLSON	DD-982	MI 34092-1220	C
CXF		LUCE	DDG-38	MI 34092-1256	M
CXG		O'BANNON	DD-987	MI 34092-1225	C
CXH		ESTOCIN	FFG-15	NY 09569-1473	PA
CXI		BUTTE	AE-27	NY 09565-3005	E
CXJ		SAMUEL E. MORISON	FFG-13	MI 34092-1471	C
CXK	USCG	GALLATIN	WHEC-721		
CXL		BLAKELY	FF-1072	MI 34090-1432	C
CXM		MC INERNEY	FFG-8	MI 34092-1466	M
CXN		PORTLAND	LSD-37	NY 09582-1725	LC
CXO	USNS	HARKNESS	T-AGS-32	NY 09573	NHA
CXP	USNS	WACCAMAW	T-AO-109	MI 34093	NHA
CXQ		CANISTEO	AO-99	NY 09566-3017	N
CXR	USNS	SIRIUS	T-AFS-8	NY 09527	NHA
CXS	USCG	DALLAS	WHEC-716		
CXT		THORN	DD-988	MI 34093-1226	C
CXU	USNS	NEOSHO	T-AO-143	NY 09579	NHA
CXV		NEWPORT	YACHT	NY 02840	NT
CXW		EDSON	DD-946	NY 09568-1200	NT
CXX*		THOMAS JEFFERSON	APA 30		
CXY	USCG	STEADFAST	WMEC-625		
CXZ		WAINWRIGHT	CG-28	MI 34093-1151	C
CYB		CLARK	FFG-11	NY 09566-1469	PA
CYC		SHENANDOAH	AD-44	NY 09551-2540	N

NAVY

CYD		SUMTER	LST-1181	NY 09587-1802	LC
CYE		LEXINGTON	AVT-16	MI 34088-2700	PE
CYF		CALIFORNIA	CGN-36	SF 96662-1163	A
CYG		TICONDEROGA	CG-47	NY 09588-1158	N
CYH		FAHRION	FFG-22	MI 34091-1478	C
CYI		FULTON	AS-11	Y 09423-2565	G
CYJ		STARK	FFG-31	MI 34093-1487	M
CYK		CONCORD	AFS-5	NY 09566-3034	N
CYL		KIDD	DDG-993	NY 09576-1265	N
CYM		JACK WILLIAMS	FFG-24	MI 34093-1480	M
CYN*		SAMPLE	FF-1048	SF 96678-1408	PH
CYO		MARVIN SHIELDS	FF-1066	SF 96678-1426	SD
CYP*		DAVIDSON	FF-1045	SF 96663-1406	PH
CYQ		BRUNSWICK	ATS-3	SF 96661-3219	PH
CYR		MOBILE	LKA-115	SF 96672-1702	LB
CYT		YORKTOWN	CG-48	NY 09594-1159	N
CYU		VIGILANT	WMEC-617	CT 33701	
CYV	USNS	DUTTON	T-AGS-22	NY 09582	NHA
CZA		DEYO	DD-989	MI 34090-1227	C
CZB		KITTIWAKE	ASR-13	NY 09576-3208	N
CZC		SURIBACHI	AE-21	NY 09587-3000	E
CZD		CONYNGHAM	DDG-17	NY 09566-1247	N
CZE	USCGC	CHILULA	WMEC-153		
CZG		JOHN HANCOCK	DD-981	MI 34091-1219	M
CZH*		KOELSCH	FF-1049	MI 34090-1405	M
CZI		MERRIMACK	AO-179	NY 09578-3020	N
CZJ		ARKANSAS	CGN-41	SF 96660-1168	SD
CZK	USCGC	VIGOROUS	WMEC-627		
CZL		SYLVANIA	AFS-2	NY 09587-3031	N
CZM*		FT SNELLING			
CZN		BOONE	FFG-28	MI 34093-1484	M
CZO		STEPHEN W.GROVES	FFG-29	MI 34091-1482	M
CZP		GALLERY	FFG-26	MI 34091-1482	M
CZQ*		BRUMBY	FF-1044	MI 34090-1405	M
CZR	USNS	POWHATAN	T-ATF-166	NY 09582	NHA
CZS		PLATTE	AO-186	NY 09582-3022	N
CZT		ANTRIM	FFG-20	MI 34090-1476	M
CZU		MONONGAHELA	AO-178	NY 09578-3019	N
CZV		HAYLER	DD-997	NY 09573-1231	N
CZW		ENGAGE			
CZX		HOLLAND	AS-32	MI 34079-2585	C
CZY		SCOTT	DDG-995	NY 09587-1267	N
CZZ	USNS	MISSISSINEWA	T-AO-144	MI 34092	NHA

** Decommissioned*

Other U.S. Navy MARS Stations

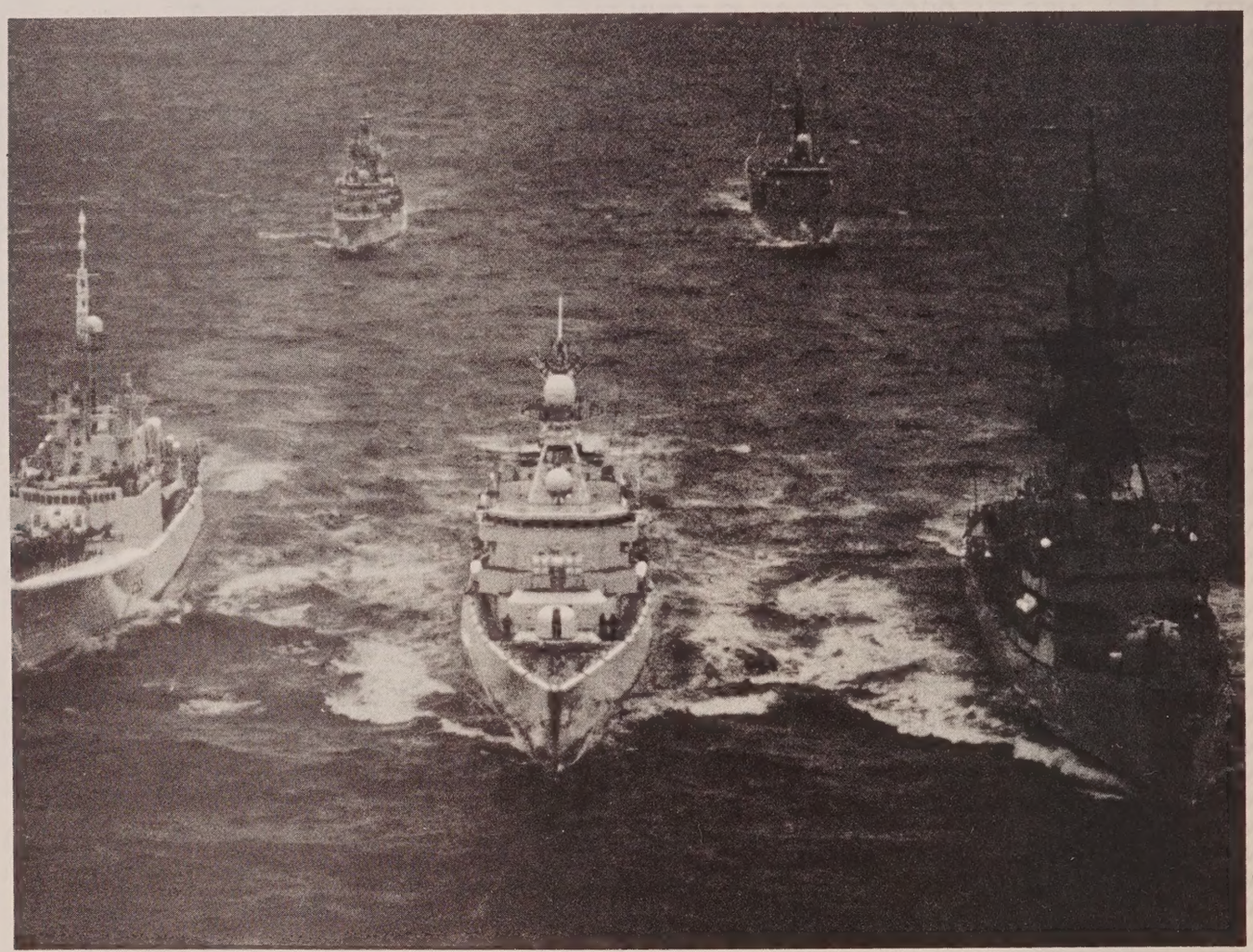
Call	Station	Type/Hull #	Homeport
NAD	USS RECOVERY		
NAE	WINTER HARBOR, ME		
NAP	USS MILWAUKEE	AOR-2	NY 09578-3024
NAV	HQ WASHINGTON, DC		
NBG	MC MURDO STATION ANTARCTICA		
NCA	MARCOS ISLAND		
NCE	KURE ISLAND		
NCG	USCG ALEXANDRIA, VA		
NIG	PENSACOLA, FL		
NIK	MAYPORT, FL		

NIM	GULFPORT, MS			
NMC	WASHINGTON, DC			
NOF[1]	NORFOLK, VA	COMFEWSG, BLDG SP 71, NAS, NORFOLK, VA 23455		
NOK[1]	NORFOLK, VA	COMFEWSG, BLDG SP 71, NAS, NORFOLK, VA 23455		
NOT[1]	NORFOLK, VA	COMFEWSG, BLDG SP 71, NAS, NORFOLK, VA 23455		
NPA	PALMER STATION ANTARCTICA			
NPN	GUAM			
NQI	NORFOLK, VA			
NRD	PUERTO RICO			
NRO	ROTA SPAIN			
NSD	SAN DIEGO, CA			
NSF	ALAMEDA, CA			
NTI	LONG BEACH, CA			
NTR	USS THEODORE ROOSEVELT	CVN-71	NY 09599-2871	N
NVP	MIDWAY ISLAND			
NVT	JAPAN			
NXA	USCGC INGHAM	WHEC-35		
NXB	USS DONALD B.BEARY	FF-1085	NY 09565-1445	N
NXC	USS CAPODANNO	FF-1093	NY 09566-1453	NT
NXD	USCGC BRAMBLE	WAGL-392		
NXE*	USS ALBANY	SSN-753		
NXF	USCGC WESTWIND	WAGB-281		
NXG	USS PRESERVER	ARS-8	NY 09582-3200	LC
NXH*	USCGC BURTON ISLAND			
NXI*	USS MIRSCHER			
NXJ	USS BARNEY	DDG-6	NY 09565-1236	N
NXK	USS IWO JIMA	LPH-2	NY 09561-1625	N
NXL	USS PHARRIS	FF-1094	NY 09582-1454	N
NXM	USS CALOOSAHATCHEE	AO-98	NY 09566-3016	N
NXN	USS YOSEMITE	AD-19	MI 34083-2510	M
NXO	USCGC GLACIER	WAGB-4		
NXP*	USS JONAS INGRAM			
NXQ	USS OPPORTUNE	ARS-41	NY 09581-3204	LC
NXR	USA FEARLESS	MSO-442	MI 34091-1907	C
NXS	USCGC MALLOW	WLB-396		
NXT	USS RICHARD E.BYRD	DDG-23	NY 09565-1253	N
NXU	USS HOIST	ARS-40	NY 09573-3203	LC
NXV	USCGC MELLON	WHEC-717		
NXW	USS BIDDLE	CG-34	NY 09565-1157	N
NXX	USS EDENTON	ATS-1	NY 09568-3217	LC
NXY	USCGC CHASE	WHEC-718		
NXZ	USS SELLERS	DDG-11	MI 34093-1241	C
NYC	TRUK ISLAND			
NYN	CHESAPEAKE, VA			
NZA	USS THOMAS C.HART	FF-1092	NY 09573-1452	N
NZB	USS MAHAN	DDG-42	34092-1260	C
NZC	USS JOSEPHUS DANIELS	CG-27	NY 09567-1150	N
NZD	USNS PONCHATOULA	AO-148	SF 96675	NHA
NZE*	USS SARGO			
NZF	USCGC BUTTONWOOD	WLB-306		
NZG*	USCGC BIBB			
NZH*	OCEANOGRAPHIC UNIT FIVE			
NZI	USS BADGER	FF-1071	SF 96661-1431	PH
NZJ	USS OUELLET	FF-1077	SF 96674-1437	PH
NZK	USS VREELAND	FF-1068	MI 34093-1428	M
NZL	USS CONSTELLATION	CV-64	SF 96635-2780	SD
NZM	USS NEW ORLEANS	LPH-11	SF 96627-1650	SD
NZN	USS MOUNT VERNON	LSD-39	SF 96672-1727	LB
NZO	USS JOUETT	CG-29	SF 96669-1152	LB
NZP	PT CANAVERAL, FL			
NZQ	USS CORAL SEA	CV-43	NY J09550-2720	N
NZR	USS LA SALLE	AGF-3	NY 09577-3320	PA

NAVY

NZS	USS SHARK	SSN-591	NY 09587-2308	G
NZT	USS BLUEBACK	SS-581	SF 96661-3403	SD
NZU	USS MEYERKORD	FF-1058	SF 96672-1418	SD
NZV	USS DENVER	LPD-9	SF 96663-1712	SD
NZW	USCGC EVERGREEN	WMEC-295		
NZX	USCGC POLAR STAR	WAGB-10		
NZY*	USS TAWAKON			
NZZ	USS KITTY HAWK	CV-63	SF 96634-2270	SD

** Decomissioned*
[1] Used by the Com. Fleet Electronic Warfare Support Group (COMFEWSG) as mobile training units which can work off any USN ship at any time.



Canada

Naval Communications

Halifax to ships (USB)
13415 13515

Submarine Distress Buoys:
4340

Israel

Naval Communications

8518.1 4XZ (CW)
12984.2 4XZ Haifa (Navy CW)

Japan

Navy CW

12568 JJF (Tokyo)

United Kingdom

Navy CW

12824.2 GUY Gibraltar

Australia

Royal Navy

Darin, Brisbane and ships
8294.5

New Zealand

Navy CW

8598.4 ZLO4 Irirangi, Wairou
8623 ZLP4 Irirangi, Wairou

Italy

Navy (CW)

13657 IDR5 Rome

USSR

Navy (CW)

Frequencies: 7779 7965 9370.5
Callsign: RIW (Khiva)

Inter-American Naval Telecommunications

RTTY

(75 baud/850 Hz shift)

11000	16194	
11570	18988	(Day)
12182	19616	
13371.5	20350	
13550	21792	
13700	22810	
13704.7	25516	
13904.5 (Night)		

USB

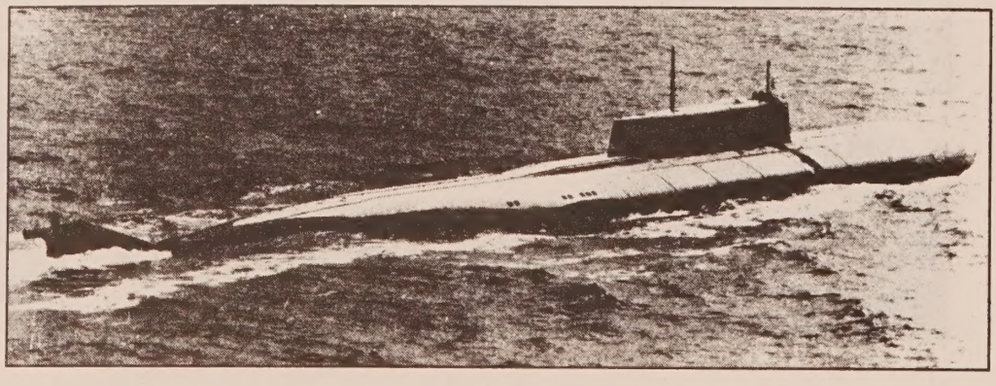
12183 15611.5 18990

CW

13555	CCES Chile
14430	
17590	CXR Montevideo, Uruguay
	LOL Buenos Aires, Argentina
	YWM1 Bolivar, Venezuela
	5KM Colombia

Callsign	Location
NBA	US Navy - Balboa
LOL	Argentinian Navy - Buenos Aires
PWZ	Brazilian Navy - Rio de Janeiro
CCQ	Chilean Navy
5KM	Colombian Navy, Bogota
HDN	Ecuadorian Navy, Quito
HIWF-1	Dominican Republic Navy
ZPK	Paraguay Navy
OBC	Peruvian Navy
YWM-1	Venezuelan Navy
CXR	Uruguayan Armada, Montevideo

Nuclear-powered Russian missile sub



CW Beacons

Although not as intriguing as the spy numbers stations, single-letter high frequency beacons (SLHFB) have been reported for some 20 years. The Cuban W beacon was reportedly destroyed by a commando raid.

Most appear to be land-based, 50 Hz A.C. operated (some use diesel generators) and use high accuracy frequency synthesis. Not all beacons are on 24 hours; they have scheduled operating periods. Some higher frequency signals are harmonics of lower frequency beacons.

Repeating their Morse letter identifications every few seconds, some send 5-digit weather code in Russian Cyrillic. U beacons simultaneously send 5-digit CW number groups. Different CW messages have different group counts, each sent twice at about 20 G.P.M. The U beacon mode then resumes for 30-60 seconds and another message is sent. This cycle may be repeated as many as six times. K and U beacons are FSK mode while the cluster beacons are all CW (on-off keying).

The FCC and military intelligence agencies have determined that some of these originate in the USSR. Are they propagation sounders? Submarine navigational markers? Weather buoys? Part of the Russian Navy's readiness command? The questions are still unanswered.

A representative list of beacons, frequencies and locations is printed below.

BEACON	"K" Khabaroosk	2843.5 3978.5 4005.5 4523.5 7905.5 7953.5 8144.5 8158.5 8974.5 9043.5 10570.5 10645.5 11155.5 12150.5 14477.5 14967.5 15811.5 16316.5 18016.5 18347.5 22310.5 22748.5 28965.5
BEACON	"U" Multiple sites N. Arctic Sea	3636.5 4448.5 6245.5 7395.5 7569.5 8078.5 8136.5 8670.5 9057.5 9314.5 10216.5 12185.5 12328.5 13339.5 15655.5
BEACON	"A"	5758 7435
BEACON	"V"	3561 7394.5
BEACON	"X"	6771
BEACON	"W"	9312
BEACON	:S: Arkhangelsk	3564.5 5305.5 6801.5 8645.5 10643.5 13643.5 17015.5 20991.5
BEACON	"C" Moskva	3565 5306 6802 8646 10644 13636 17016 20992
BEACON	"P" Kalingrad	3565.5 4031 5306.5 6802.5 6993 8646.5 10644.5 13636.5 17016.5 20992.5
BEACON	"D" Odessa	3566 5307 6803 8647 10645 13636 17017 20993
BEACON	"G"	3566.5 5307.5 6803.5 8647.5 10645.5 13637.5 17017.5 20993.5
BEACON	"O" Moskva	3576 5308 6804 8648 10646 13638 17018 20994
BEACON	"Z" Mukachevo	3567.5 5308.5 6804.5 8648.5 10646.5 13638.5 17018.5 20994.5
BEACON*	I-O Kzyl Orda	3568 5309 6805 8649 10647 13639 17019 20995

*I-O (or "YU")--This Russian cyrillic character is heard in Morse as..--

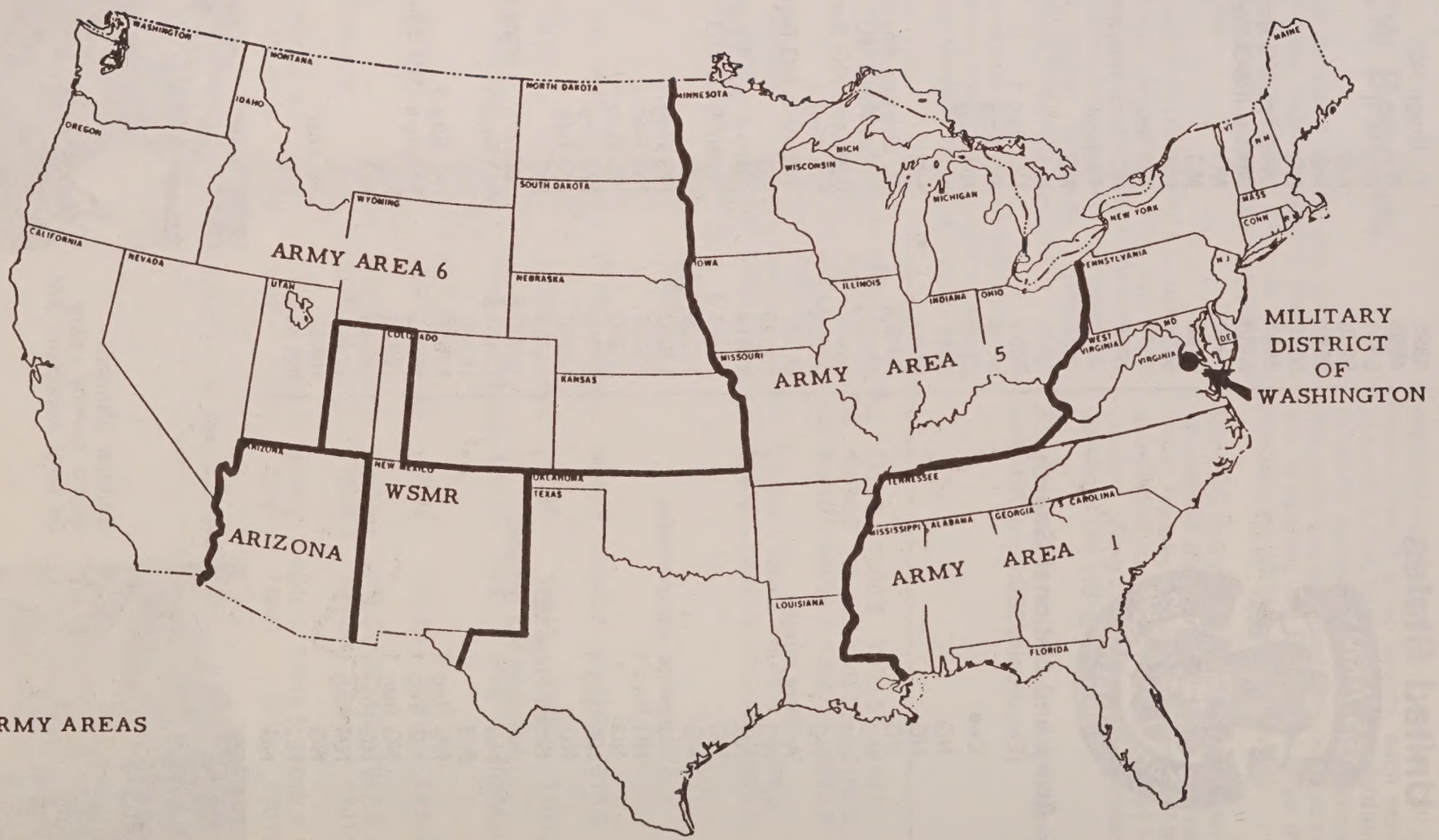
United States

U.S. Army and National Guard

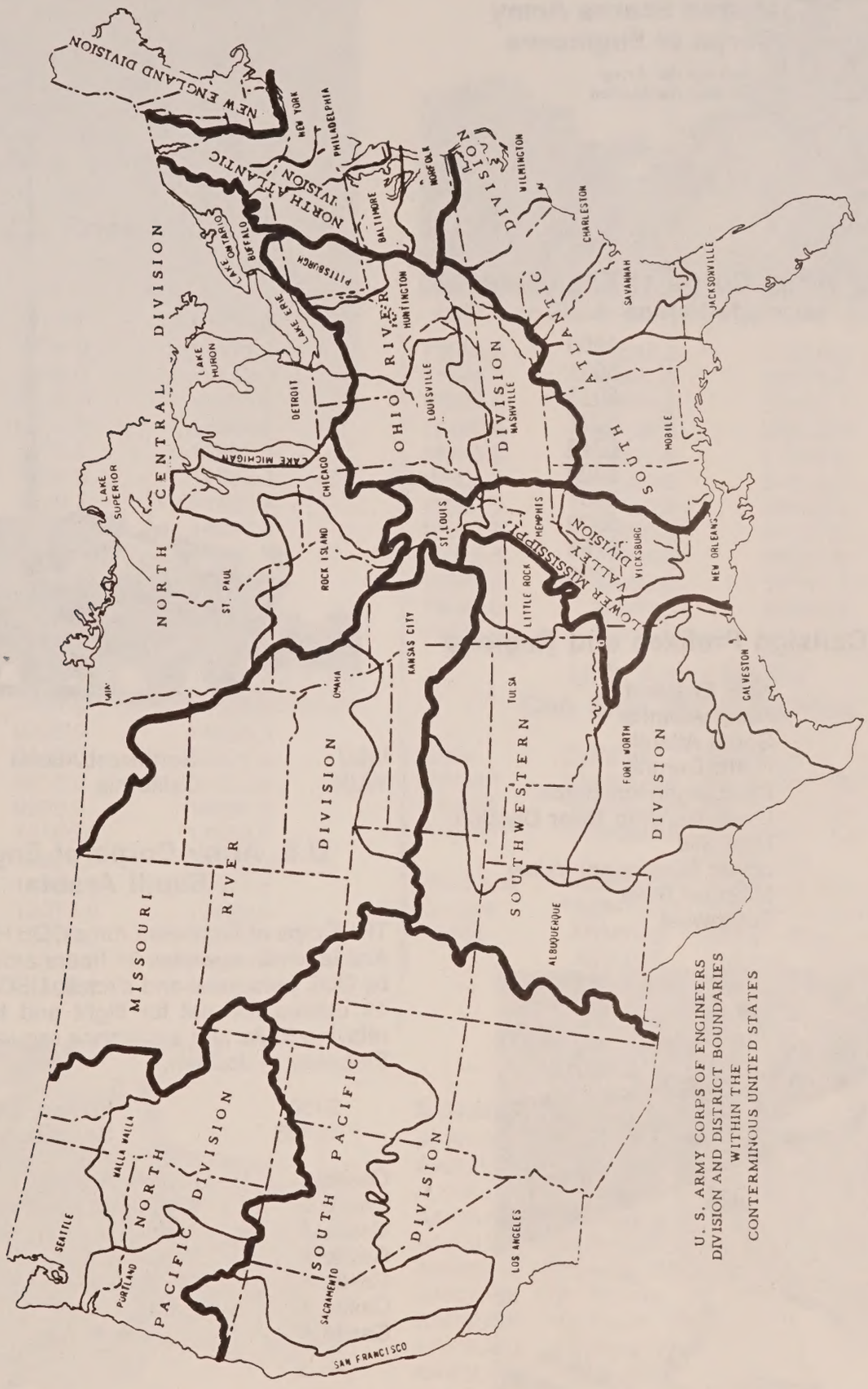
(Emission: USB)

Freq	Use
2220	NG
2258	NG
2300	NG
2360	NG
2390	NG
2566	NG
2713	Artillery range
3175	NG
3205	NG
3261	NG
4000	NG
4001.5	Statewide administrative
4030	NG Reg 1
4035	NG
4233	NG Reg 1
4250	NG
4263.5	Smart Field MO
4280	Jefferson MO Barracks
4290	NG
4365	NG
4415	NG Reg 1
4520	NG Reg 1
4610	NG Reg 1
4640	NG Reg 1
4780	NG Reg 1
4840	NG
4870	NG
4885	NG
4895	Ft. Bragg NC
4898	NG
5090	NG
5235	NG
5397	NG
5850	NG
5997	Jefferson MO Barracks
6460	Jefferson MO Barracks
6910	NG
6988	NG
6994	NG
7360	NG Reg 1
7835	NG Yoro, Honduras
7861	Tactical
7932	NG
8040	NG
8060	NG Reg 1
8170	NG Reg 1
8180	NG Reg 1
8500	NG
8565	NG
8603.5	Ft. Leonard Wood MO
8615.5	Smart Field MO
8624	Jefferson MO Barracks
9122.5	NG Reg 1
9650	Jefferson MO Barracks
10586	NG
11510	320 FA Unit/1st Brigade
11764.5	Smart Field MO
12000	NG
12060	NG Reg 1
12090	NG Reg 1
12240	NG Reg 1
12255	NG Reg 1
12270	NG Reg 1
12355	NG
12908.5	Jefferson Barracks MO
13524.5	NG Reg 1
13540	NG
13555	NG Reg 1
15233	Jefferson MO Barracks
16320	NG
16340	NG
17460	NG
19090	Tactical
22126	NG

Georgia National Guard convoy using 38 MHz wideband FM


ARMY AREA 6
ARMY AREA 5
ARMY AREA 1
ARIZONA
WSMR
MILITARY DISTRICT OF WASHINGTON
WASHINGTON
OREGON
CALIFORNIA
IDAHO
NEVADA
MONTANA
WYOMING
UTAH
COLORADO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
WISCONSIN
ILLINOIS
MICHIGAN
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
GEORGIA
S CAROLINA
FLORIDA
LOUISIANA
WEST VIRGINIA
VIRGINIA
PENNSYLVANIA
NEW YORK
MD
DE
NJ
CONN
MASS
VT
NH
MAINE

ARMY AREAS



U. S. ARMY CORPS OF ENGINEERS
DIVISION AND DISTRICT BOUNDARIES
WITHIN THE
CONTERMINOUS UNITED STATES

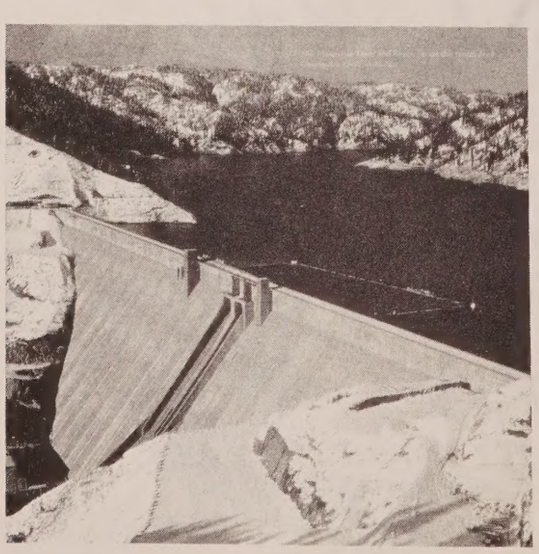
United States Army Corps of Engineers
...Serving the Army
...Serving the Nation

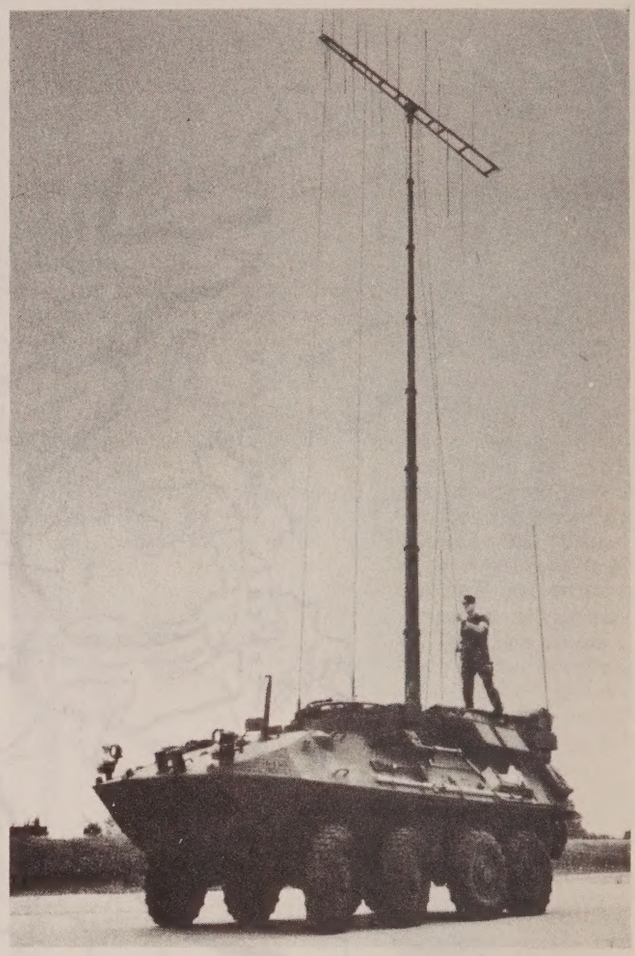
U.S. Army Corps of Engineers
Nationwide Network (USB)

2064	4850
2300	5011
2326	5015
2348.5	5327
2350	5346
2602	5400
2605	5437
3287	6020
3290	6785
3302	6790
3305	

COE Callsign Prefixes and Regions

WUA	New England
WUB	North Atlantic
WUC	South Atlantic
WUD	North Central
WUE3/4	Pittsburgh/Huntington
WUE5	Louisville/Ohio River Division
WUE6	Nashville
WUG	Lower Mississippi Valley
WUH	Missouri River
WUI	Southwest





WUJ	Northwest/Alaska
WUK	California

U.S. Army Corps of Engineers Saudi Arabia

The Corps of Engineers run a COE HF Net in Saudi Arabia which operates 24 hours a day and is used by COE personnel and aircraft, USDAQ Jeddah C-12 utilizes the net for flight and followings and relaying ETAs and assistance requests to the U.S. Embassy in Jeddah.

9130	Primary USB/LSB
11425	Secondary LSB

Castle 1	Riyadh Airport
Castle 2	Khamis Mushait Airport
Castle 3	Jeddah Airport
Castle 4	Tabuk Airport
Castle 6	Dhahran Airport
Castle 7	Jubail Airport
Castle 8	Al Batin Airport

The U.S. military runs a training mission from Sat. to Wed. 0430-1330 GMT using 7300 USB and 12112 USB.

Hotel 1	NCS Dhahran Int'l Airport
Hotel 2	Riyadh Airport
Hotel 3	Khamis Mushait Airport
Hotel 4	Taif Airport
Hotel 8	Tabuk Airport

U.S. Army MARS

Frequencies:

2001.0	5760.0	13511.0
2220.0	6766.0	13514.0
2259.5	6825.0	13743.0
2308.0	6910.0	13505.0
2358.5	6988.0	13508.5
2813.5	6995.5	13997.5
3235.5	6997.5	14402.0
3237.0	7309.5	14406.5
3245.0	7311.0	14440.0
3257.0	7313.5	14485.5
3273.5	7360.0	14487.0
3276.5	7405.0	14510.0
3289.0	7590.0	14513.0
3347.0	7720.0	14580.5
4001.5	7849.5	14665.0
4004.0	9181.0	14847.5
4012.0	9305.0	14855.5
4020.0	9419.0	14877.5
4025.0	9810.0	14930.0
4030.0	9990.0	14936.5
4035.0	10165.0	14938.0
4446.5	10815.0	14939.5
5115.0	11990.0	16441.5
5208.0	12072.0	17459.0
5217.0	13479.0	17498.5
5396.0	13505.0	17501.5
5401.0	13508.0	

Pohakuloa Training Area, Hawaii

MO Nat'l Guard at Palmerola AFB, Honduras

17520.0	19534.0	20941.5
17546.5	19840.0	20975.0
17594.0	20078.5	20992.5
18129.5	20105.5	20995.5
18212.5	20221.0	21825.5
19004.5	20520.0	24012.5
19007.5	20560.0	24050.0
19010.5	20650.5	24197.5
19013.5	20655.0	24560.0
19024.0	20665.0	24761.5
19029.0	20812.0	24860.0
19531.0	20921.5	

U.S. Army MARS Call Sign Identifications

Area	Callsign	Location
Eastern	*AAA3USA	Ft. Meade, MD
Central	*AAA6USA	Ft. Sam Houston, TX
Western	*AAA9USA	Presidio of San Francisco
Westcom	*ABM6USA	Schofield Bks HI
Europe	*AEM1USA	Pirmasens Germany
Pacific	ABM1US	Camp Zama Japan
	ABM2US	Zukeran, Okinawa
	*ABM4USA	Camp Coiner (Seoul) Korea

** Gateway/relay station*

Eastern

AAR1USA	Ft Devins MA
AAM2USA	Ft Monmouth NJ
AAR2USA	Ft Dix NJ
AAR2USB	Ft Drum NY
AAR3USA	Ft Belvoir VA
AAR3USD	Carlisle Barracks PA
AAR3USE	Ft Monroe VA
AAR3USF	Ft Eustis VA
AAR3USG	Ft Story VA
AAR3USH	Ft Lee VA
AAR3WCQ	Tobyhanna PA
AAR4USB	Ft Benning GA

ARMY

AAR4USC	Ft Bragg NC
AAR4USD	Ft Jackson SC
AAR4USE	Ft McClellan AL
AARUSG	Ft Knox KY
AAR4USH	Ft Campbell KY
AAR7USF	Ft Rucker AL
AAT4USA	Ft Gordon GA

Central

AAR5USE	Rock Island Arsenal IL
AAR5USF	Ft Ben Harrison IN
AAR6USC	Corpus Cristi TX
AAT6USE	Ft Hood TX
AAT6USF	Ft Bliss TX
AAT6USG	Ft Polk LA
AAT6USH	Pine Bluff Arsenal AR
AAT7USC	Ft Leonard Wood MO
AAT7USD	Ft Riley KS
AAT7USS	Ft Leavenworth KS

Western

AAR5USB	Ft Lewis WA
AAR0USC	Silverton OR
ABM6EPV	Army Reserve Hilo HI
ABM6EQO	Schofield Bks HI
ALM7USA	Ft Richardson OK
AAR8USB	Ft Carson CO
AAR8USC	Ogden UT
AAR8USD	Lakewood CO
AAR8USE	Golden CO
AAR8USF	Denver CO
AAR8USH	Dugway UT
AAR8USI	Cheyenne WY
AAR9USB	Ft. Huachuca AZ
AAR9USC	Yuma Proving Grounds AZ
AAR9USD	Fort Ord CA
AAR9USE	Mesa AZ
AAR9USF	Phoenix AZ
AAR9USG	Santa Rosa CA
AAR9USH	Alameda CA
AAR9USI	San Jose CA
AAR9USJ	San Mateo CA
AAR9USK	Camp Parks CA
AAR9USL	Sparks NV
AAR9USM	Carson City NV
AAR9USO	Genoa NV
AAR9USP	Sebastopol CA
AAR9USQ	Petaluma CA
AAR9USR	Sierra Ad CA
AAR9USS	Sacramento Ad CA
AAR9UST	Chico CA
AAR9USU	Santa Barbara CA
AAR9USV	Ft Irwin CA

Europe

AEM1AB	Aschaffenburg Germany
AEM1AC	Wurzburg Germany
AEM1AGG	Ansbach Germany
AEM1AH	Wiesbaden Germany
AEM1ASA	Ausburg Germany
AEM1BPM	Baumholder Germany
AEM1CC	Worms Germany
AEM1CLA	Ludwigsburg Germany
AEM1DR	Stuttgart Germany
AEM1DZ	Mainz Germany
AEM1EO	Geissen Germany
AEM1EWA	Frankfurt Germany
AEM1FHZ	Friedburg Germany
AEM1HKE	Schwabisch Gmund Germany
AEM1JY	Hanau Germany
AEM1KFD	Darmstadt Germany
AEM1KP	Karlsruhe Germany
AEM1KZ	Neckarsulm Germany
AEM1LT	Landstuhl Germany
AEM1MAN	Nellingen Germany
AEM1OV	Pirmasens Germany
AEM1QF	Berlin Germany
AEM1TX	Garlstedt Germany
AEM1US	Heidelburg Germany
AEM1USA	Lohnsfeld Germany
AEM1XL	Mannheim Germany

Pacific

ABM1AD	Sagami Japan
ABM1AF	Yokota AFB Japan
ABM1CC	Camp Zama Japan
ABM1FC	Atsugi Japan
ABM1YP	Yokohama Japan
ABM2QW	Tori (Sobi) Sta Okinawa
ABM4AC	USASG-JSA (Panmumjon) Korea
ABM4BC	CP Page (Chunchon) Korea
ABM4CA	CP Ames Tajon Korea
ABM4CC	CP Carroll Waegwan Korea
ABM4CG	CP Red Cloud (Uijongbou) Korea
ABM4CH	CP Humphres (Pyongtek) Korea
ABM4EB	CP Mercer (Kimpo) Korea
ABM4DL	CP Long (Wongu) Korea
ABM4GO	CP Gary Owens Korea
ABM4IH	CP Casey (Tongduchon) Korea
ABM4SI	Sihungni Korea
ABM4ST	CP Walker Korea
ABM4TE	38th ART BDE Korea
ABM4TW	CP Stanley Korea
ABM4UF	Haileah (Pusan) Korea
ABM4VF	CP Howze (Musauni) Korea
ABM4WI	Seoul Korea
ABM9AJ	Jusmag Bangkok Thailand

Canada

Canadian Forces Amateur Radio
(CFAR) Network

Similar to US MARS, the Canadian military also provides point-to-point USB communications for service personnel.

Freq	Call	Station
6905		Al Ismailiyah
13971(Alpha)	CIC9	Golan Heights, Syria
	CIS9	Petawana, Ont.
	CIW91	Lahr, W. Germany
	CIW2102	Victoria, BC
	CIW601-628	Quebec, PQ
14385 (Bravo)	CRW210	
	CRW610	
20957	VXN9	Nicosia, Cyprus
	VXV9	Golan Heights, Syria
	CIX9	Petawana, Ont.

Other Callsigns

CIW802-806	Naval vessels
VEV9	Valcartier, PQ

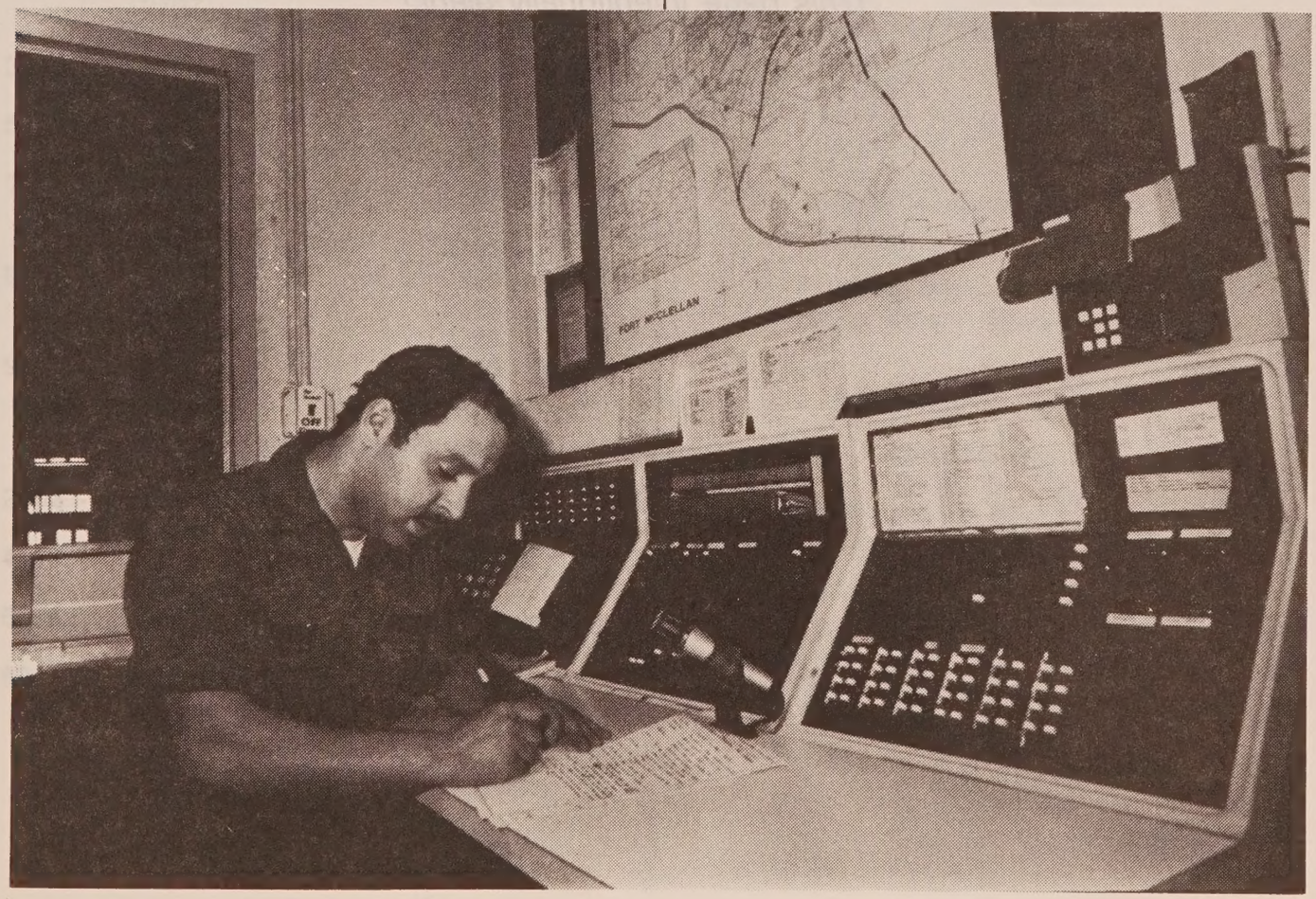
Great Britain

Balize City, Belize (MSS)
11462 USB/CW

Bahamas

Bahamas Defense Force

With headquarters in Nassau this expansive police agency uses two HF channels on upper sideband to link fixed and mobile units throughout the island territory. Nassau may identify as "Nassau Control," "Coral Harbor" or "Police Control" on 3786 kHz (night) or 5217 kHz (daytime).



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(See Maritime worldwide ship-to-shore duplex voice list for frequencies shared with domestic coastal stations.)

Primary Coast Guard Stations

Boston (NMF), Portsmouth (NMN), Miami (NMA), New Orleans (NMG), San Juan (NMR), Long Beach (NMQ), San Francisco (NMC), Kodiak (NOJ), Honolulu (NMO), Elizabeth City (NOZ), Guam (NRV)

District Operations - USB

Simplex

Dist.	Freq.	11	2675
1	2694		2694
	2707		2710
	3253		3382
3	2662	12	2659
	2686		2686
5	2675		5320
	2702	13	2699
7	2678		2707
	2691	14	2683
	5320		2702
8	2683		5320
	2699	17	2678
	5320		2748
9	2678		4575
	3241		

Emergency/Distress

2182	International Distress and Calling (USB)
4125	Callback/Reply to 2182 Central/ S.America/Africa
6215.5	Callback/Reply to 2182 SE Asia/ S. Pacific
8364	International Lifeboat Distress & Calling (CW/MCW)

CG Common/Civilian Liaison

2670

Search and Rescue

3023	SSB
5680	Aeronautical (SSB/CW)

Coast Guard Air to Ground - USB

Freq.	Primary Use
2141	Alaska only
2261	US only
3120	Helicopter
3123	
5692	Helicopter
5696	
6341	Fixed wing
8980	Helicopter
8984	
11195	
11198	Helicopter
11201	
15081	
15084	Helicopter
15087	

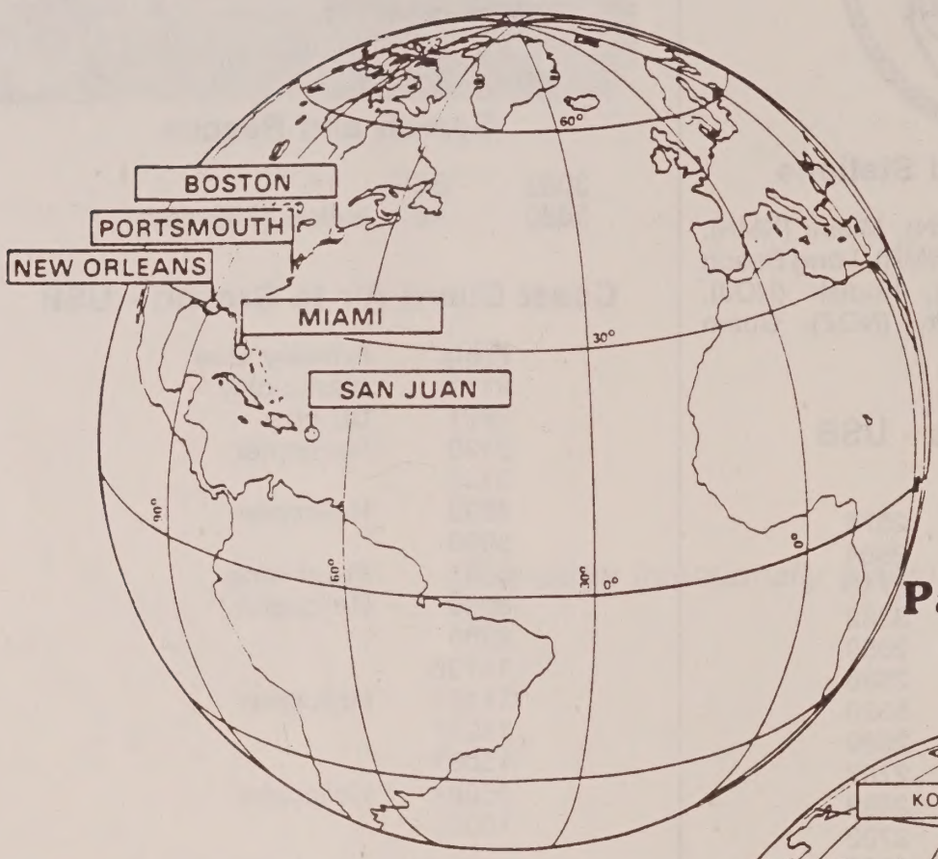
Secondary - CW/RTTY

4335 6381 8648 12887.5

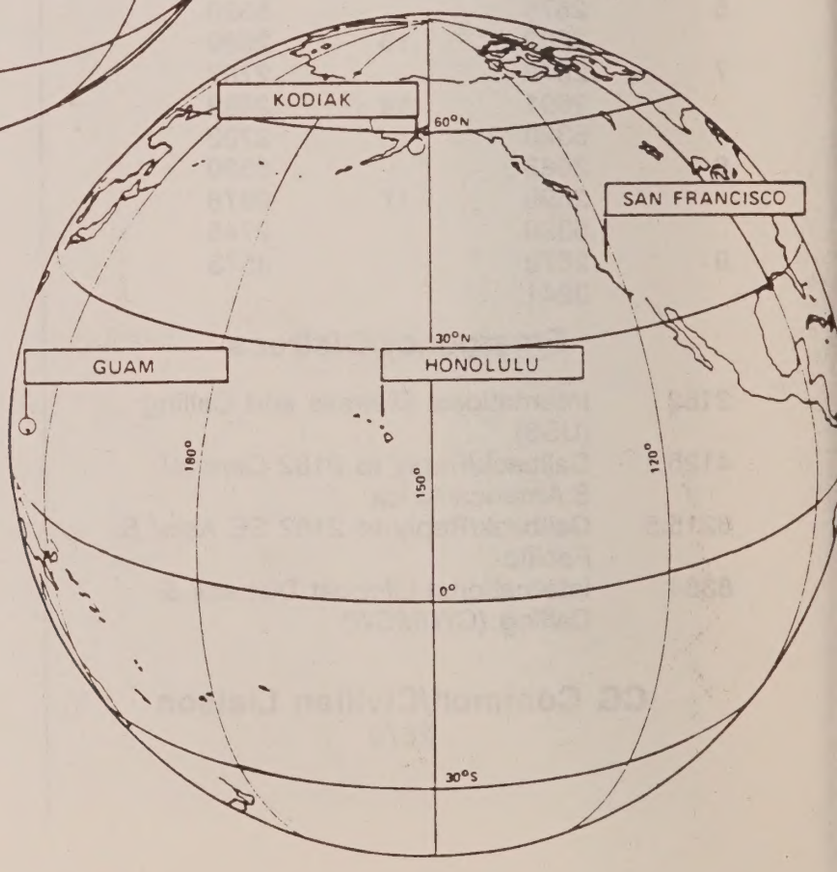
List of Air Stations

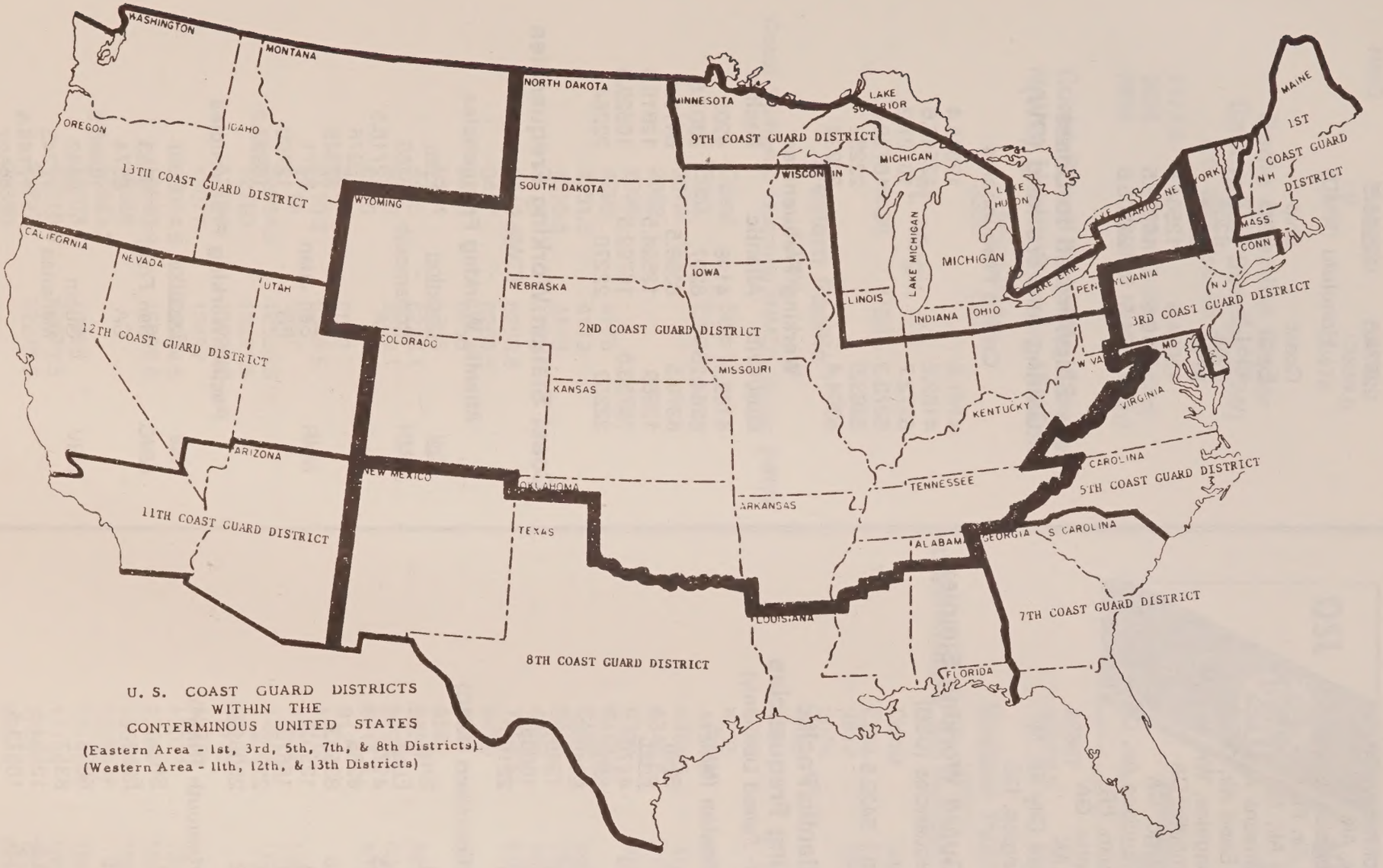
NOU	Annette, AK
	Arcata Air, WA
NMW51	Astoria Air, OR
NM012	Barbers Point Air, HI
	Boronquen Air, PR
NOP	Brooklyn Air, NY
NOS	Cape Code Air, MA
NMK	Cape May Air, NJ
NOH	Chicago Air, IL
	Clearwater, FL
NOY8	Corpus Christi, TX
	Corpus Christi Air, TX
NOI	Detroit, MI
NOZ	Elizabeth City Air, NC
NOY9	Houston, TX

COMMUNICATION/RADIO STATIONS, ATLANTIC, 1980'S



Pacific, 1980'S





U. S. COAST GUARD DISTRICTS
WITHIN THE
CONTERMINOUS UNITED STATES
(Eastern Area - 1st, 3rd, 5th, 7th, & 8th Districts)
(Western Area - 11th, 12th, & 13th Districts)

Headquarters of U.S.C.G. Districts

1. Boston
2. St. Louis
3. New York
5. Norfolk
7. Miami
8. New Orleans
9. Cleveland
11. Long Beach
12. Alameda
13. Seattle
14. Honolulu
17. Juneau

COAST GUARD

	Humboldt Bay, CA
NOJI	Kodiak, AK
NM027	Los Angeles, CA
NOM	Miami Air, FL
NOQ	Mobile Air, AL
NMG8	New Orleans Air, LA
	North Bend Air, OR
NOW	Port Angeles, WA
	Sacramento, CA
NOR	San Diego, CA
NOF	San Francisco Air, CA
NMR26	San Juan, PR
NMB9	Savannha, GA
	Sitka, AK
NOT	Traverse City Air, MI
NMH1	Washington, DC

Intra-Coast Guard Working Simplex

Frequencies (USB)

2103.5 Pri
2667 2670 5422.5

Atlantic/Pacific Working Frequencies

(RTTY- Paired Use Only)

Boston (NMF)

Coast Freq.	Ship Freq.
4355.5	4176
6500	6262
8710.5	8349.5
13077	12497
17203	16666
22567	22198

San Francisco (NMC)

Coast Freq.	Ship Freq.
4355.5	4176
6504	6266
8714.5	8353.5
13081	12501
17207	16670
22571	22202
25380	25085.8

Portsmouth (NMN)

Coast Freq.	Ship Freq.
4351.5	4172
6496	6258
8718	8357
13084.5	12504.5
17210.5	16673.5
22574.5	22205.5

Honolulu (NMO)

Coast Freq.	Ship Freq.
4351.5	4172
6966	6258
8718	8357
13084.5	12504.5
17210.5	16673.5
22574.5	22205.5

Ship/Aircraft to Coast Calling and Working (CW)

Calling Frequencies

4181.8	12545.4
4182.2	12546.6
6272.7	16727.2
6273.3	16728.8
8363.6	22232
8364.4	22234

Working Frequencies

Gulf/Crib	Atlantic	Pacific
4189.5	4198	4205
6284.25	6297	6307.5
8379.5	8396.5	8410.4
12569	12594.5	12615.5
16758.5	16792.5	16820.5
22253	22270	22284

Coast Station Working Frequencies

(CW)

Atlantic Working Frequencies

Call	Location	Freq.
NMN	Portsmouth VA	8465
		12718.5
		16976
		22545
NMR	San Juan PR	8471
		12700
		16983.2

Pacific Working Frequencies

Call	Location	Freq.
NMC	San Fran. CA	6383
		8574
		16880.9
NRV	Guam Marianas	8582
		12743
		17146.4
		22527

NMO	Honolulu HI	8650 12889.5 22476

Radio Direction Finder Calibration Service (CW)

(For SAR Vessels Only)

2173.5	
2634	(Not Gulf of Mexico)
2826	(Gulf of Mexico Only)

Coast Guard Ships to Alaska Native Health Service Liaison

Bering Sea

3385	USB

Pt. Mugu, CA

5080	USB

Western Pacific

(RTTY)

Coast Stations: Honolulu (NMO), Guam (NRV)

Coast Freq.	Ship Freq.
2674	
2682	
2698	
4298	4178
4351.5	4172
4355.5	4176
4575	4179
6340.5	6268.5
6457	6269.5
6496	6258
6504	6266
8465	8298.1
8510	8299.1
8570	
8574	8682
8710.5	8349.5
8718	8357
12664.5	12520.5
12750	12521.5
12786	16695.5
13077	12497
13084.5	12504.5
16880.9	16696.5
16968	
16983.2	
17203	16666
17210.5	16673.5
22527	22226.5
25380	

22567	22198
22574.5	22205.5

Eastern Pacific

(RTTY)

Coast Stations: San Francisco (NMC)

Coast Freq.	Ship Freq.
2612	2608
2674	
2682	
3389	
4230	
4298	
4351.5	4172
4355.5	4176
6340.5	4178
6355	4179
6421.5	
6467	6268.5
6496	6258
6504	6266
7351.5	6269.5
8459	
8461	8298.1
8582	
8682	8299.1
8706.5	8345.5
8714.5	8353.5
9127	
10168	
11436	12520.5
12664.5	12521.5
12714	
12743	
12750	
13073	12493
13081	12501
15656.5	16695.5
16880.9	
17146.4	16696.5
17199	16662
17207	16670
22545	22226.5

22563	22194
22571	22202
25380	
25416	25077.8
27542	
27785	27590
29892	29909

Ships - American Samoa

Frequencies (USB)

2845 5287.5 6218.6

North Atlantic (RTTY)

Coast Stations: Boston (NMF)
Portsmouth (NMN)

Coast Freq.	Ship Freq.
2444	
2648	2236
2674	
*2682	
2705	2330
3209	
3389	
*4232	
4235	
4262	
4298	4178
	4179
4351.5	4172
4355.5	4176
6340.5	
6344	
6421.5	6268.5
	6269.5
*6474	
6477.5	
6496	6258
6504	6266
7530	
*8451	8298.1
8490	8299.1
8536	
8636	
8706.5	8345.5
8714.5	8353.5
9110	
10138	
11436	
12664.5	12520.5
12732	12521.5
12790	
12934.5	
*13005	
13020	
13027.5	
13073	12493
13081	12501
15656.5	
16968.8	16695.5
17146.4	16696.5
17151.2	
17189.6	
17192	
17199	16662
17207	16670
18197.5	
22407	
22487.5	
22527	
25380	22226.5
22563	22184
22561	22292

* *NMF (Otis ANG Base) simulkeys cryptocovered RTTY on these frequencies*

Polar Icebreakers

5384.5 USB

Miami (NMA)

Frontier Guard Forces

5765 (USB)

International Ice Patrol Broadcasts

Freq.			Mode	Time (UTC)
5320	8502	12750	SITOR	0018
5320	8502	12750	CW	0050
8090			CW	2118
8502	12750		SITOR	1218
8502	12750		CW	1250
8500.1	12748.1		FAX	1600

Caribbean and Gulf of Mexico

(RTTY)

Coast Stations: Miami (NMA), New Orleans (NMG)

Coast Freq.	Ship Freq.
2236.5	
3209	
4245	4177.5
4316	4178.5
4351.5	4172
4355.5	4176
6467	6268
6491.5	6269
6496	6258

6500	6262
8441	
8457	
8554	8297.6
8682	8298.6
8710.5	8349.5
8718	8357
12754	12520
12786	12521
13077	12497
13084.5	12503.5
16959.2	16695
17002.4	16696
17203	16666
17210.5	16673.5
22545	22226
22567	22198
22574.5	22205.5
25380	

Oceanographic Data Frequencies
(SHIP/BUOY)

4164.1	8329.6	16638.1
4164.7	8330.2	16638.7
4165.3	8330.8	16639.3
6246.1	12481.1	22162.1
6246.7	12481.7	22162.7
6247.3	12482.3	22163.3

U.S.C.G. LORAN-C NETWORKS
(USB/RTTY/CW)

East Coast North Atlantic Net

Units:
Carolina Beach (NM73), Nan tucket (NMF32), Cape Race (VDB), Caribou (NMF33)

Frequencies:
2413 3256 4048.5 5313 7377.5 9278.5 11513.5

Norwegian Sea/North Atlantic Net

Units:
Angissoq (OVY), B0 (JXL), Cape Race (VDB), Ejde (OUN), Jan Mayen (JXP), Sandur (TFR), Sylt (DML), Keflavik (TFR2), St Anthony (VDB2), Shetlands (NMS)

Frequencies:
3607 7512.5 10337.5 4857.5 7717.5
13423
13707

Mediterranean Net

Units:
Sellia Marina, It. (NCI), Lampedusa, It. (NCI-3), Karga barun, Tk. (NCI-4), Rhodes, Gr. (NCI-10), Estartit, Sp. (AOB-50)

USB Frequencies:
3625.5 3798 5066 5123 6943.5 7441
8021.5 8111 9396 9474 10333.6
10938.5 10958.5 13665.5 15723 16044.5 18963
20262.5 22823 24088.5 26825

RTTY/CW Frequencies:
3625.5 6943.5 7441 8021.5 8111
9396 9473.5 10938.5 10958.5 13664.9
15722.4 18962.2 22822.4 26824.4

Central Pacific Net

Units:
Honolulu (NMO), Johnston Is (NRO), Upolu Pt (NRO5), Kure Is (NRO7)

Frequencies:
4050 5063 7473 9303
9630 12205

Northwest Pacific Net

Units:
Yokota (NRT), Gesashi (NRT2), Iwo Jima (NRT3), Hokkaido (NRT9), Marcus (NRV6), Yap (NRV7), Barrigada (NRV)

Frequencies:

2660	3786.1	3786.5	4549.5	4550.1
4883	5063	5063.6	5315.5	5320
7580	7836	7836.6	7918.5	8063
8063.6	9223	9223.6	9297	9977
10523	10523.6	11028	11606	13608
13608.6	15875	15922	17488	17488.6
19296.5	19297.1			

Aleutian Net (AK)

Units:
St Paul (NRW2), Pt Clarence (NRW3), Attu(NMJ22), Kodiak (NOJ)

Frequencies:
2748 2809 4531 4573 4575 5226
5317 5422 5745 6812 6935 6945
7441 9073 10368.5 12150

COAST GUARD

Marine Information Broadcasts

The U.S. Coast Guard observes a regular schedule of short wave broadcasts to marine interests covering weather, sea conditions, hazards, and conservation. Depending upon the season, time of day and your location, different stations will be heard.

The following schedule is presented in time-of-day format for convenience.

Time	Freq	Mode
0000	8712.5	SITOR
	17205	
0000	8150	CW
	21760	
0001	13075	SITOR
	17203	
	22576	
0020	2670	USB
0030	8680.1	FAX
	12728.1	
	17149.3	
0100	8150	CW
	21760	
0100	9050	CW
	13655	
	16457.5	
	22472.5	
0103	2670	USB
0115	4344.6	USB
	8680.6	
	12728.6	
0130	4296.1	FAX
	8457.1	
0130	8716	SITOR
	13082.5	
	22572.5	
0130	9050	CW
	13655	
	16457.5	
0133	2670	USB
0200	8488	SITOR
	13019	
	16966.6	
0200	13075	SITOR
	17203	
	22576	
0200	8150	CW
	21760	
0203	2670	USB
	6506.4	
0230	4296.1	FAX
	8457.1	
0233	2670	USB
0300	9050	CW
	13655	
	16457.5	
	22472	
0300	8150	CW
	21760	
0300	4344.6	USB
	8680.6	
	12728.6	
0303	2670	USB
0305	2670	USB
0320	2670	USB
0330	13113.2	USB
0330	8716	SITOR
	13082.5	
	22572.5	
0333	2670	USB
0350	2670	USB
0400	4428.7	USB
	6506.4	
	8765.4	
0400	13075	SITOR
	17203	
	22567	
0400	8150	CW
	21760	
0400	9050	CW
	13655	
	16457.5	
	22472.5	
0400	4344.6	USB
	8680.6	
	12728.6	
0420	2670	USB
0430	8765.4	USB
	13113.2	
0430	8716	SITOR
	13082.5	
	22572.5	
0430	9050	CW
	13655	
	16457.5	
0440	2670	USB
0500	13075	SITOR
	17203	
	22567	
0500	8150	CW
	21760	
0500	4344.6	USB
	8680.6	
	12728.6	
0530	4428.7	USB
	6506.4	
	8765.4	
0530	4296.1	FAX
	8457.1	
0530	3240.1	FAX
0533	2670	USB
0533	2670	USB
0545	2670	USB
	6506.4	

	8765.4	
0550	2670	USB
0600	8150	CW
	21760	
0600	9050	CW
	13655	
	16457.5	
0603	2670	USB
0615	2670	USB
0620	2670	USB
0630	4346	CW
	8682	
	12730	
0630	8716	SITOR
	13082.5	
	22572.5	
0700	9050	CW
	13655	
	16457.5	
	22472.5	
0705	2670	USB
0730	8716	SITOR
	13082.5	
	22572.5	
0800	8150	CW
	21760	
0900	13075	SITOR
	17203	
	22567	
0903	2670	USB
0930	6706.4	USB
1000	4428.7	USB
	6506.4	
	8765.4	
1000	8150	CW
	21760	
1020	2670	USB
1030	8765.4	USB
	13113.2	
1035	2670	USB
1040	2670	USB
1050	2670	USB
1100	13075	SITOR
	17203	
	22567	
1100	8150	CW
	21760	
1103	2670	USB
1130	6506.4	USB
	8765.4	
	13113.2	
1145	2670	USB
	6506.4	
	8765.4	
1200	8150	CW
	21760	
1220	2670	USB
1233	2670	USB
1235	2670	USB
1240	2670	USB
1250	2670	USB
1300	8150	CW
	21760	
1300	9050	CW
	13655	
	16457.5	
	22472.5	
1303	2670	USB
1330	8453.6	USB
1330	8716	SITOR
	13082.5	
	22572.5	
1333	2670	USB
1350	8502	CW
1400	8708.5	SITOR
1400	13075	SITOR
	17203	
	22576	
1403	2670	USB
1420	2670	USB
1430	4296.1	FAX
	8457.1	
1500	8150	CW
	21760	
1500	8708.5	SITOR
	13075	
	17201	
1500	4344.6	USB
	8680.6	

St. Louis Coast Guard
(courtesy Ron Seymour)

COAST GUARD

	12728.6	
1503	2670	USB
1505	2670	USB
1530	6506.4	USB
1533	2670	USB
1550	2670	USB
1600	6506.4	USB
	8765.4	
	13113.2	
1600	4296.1	FAX
	8457.1	
1620	2670	USB
1630	8765.4	USB
	13113.2	
	17307.3	
1635	2670	USB
1640	2670	USB
1645	6506.4	USB
1650	2670	USB
1700	8489	SITOR
	16966.6	
1700	9050	CW
	13655	
	16457.5	
1715	8680.1	FAX
	12728.1	
	17149.3	
1730	8716	SITOR
	13082.5	
	22572.5	
1730	8765.4	USB
	13113.2	
	17307.3	
1730	3240.1	FAX
	7528.1	
1733	2670	USB
1745	13113.2	USB
1750	2670	USB

1800	4296.1	FAX
	8457.1	
1803	2670	USB
1815	2670	USB
1820	2670	USB
1900	8682	CW
	12730	
	17151.2	
1900	8708.5	SITOR
	13075	
	17201	
2000	17149.3	FAX
2000	9050	CW
	13655	
	16457.5	
	22472.5	
2030	8716	SITOR
	13082.5	
	22572.5	
2030	9050	CW
	13655	
	16457.5	
2100	8150	CW
	21760	
2102	2670	USB
2103	2670	USB
2130	8453.6	USB
	13113.2	
2150	8502	CW
2200	6506.4	USB
	8765.4	
	13113.2	
2200	8150	CW
	21760	
2200	9050	CW
	13655	
	16457.5	
2205	2670	USB
2220	2670	USB
2230	8765.4	USB
	13113.2	
	17307.3	
2230	8716	SITOR
	13082.5	
	22572.5	
2235	2670	USB
2240	2670	USB
2250	2670	USB
2300	13075	SITOR
	17203	
	22567	
2303	2670	USB
2330	6506.4	USB
	8765.4	
	13113.2	
2330	17149.3	FAX
2345	13113.2	USB

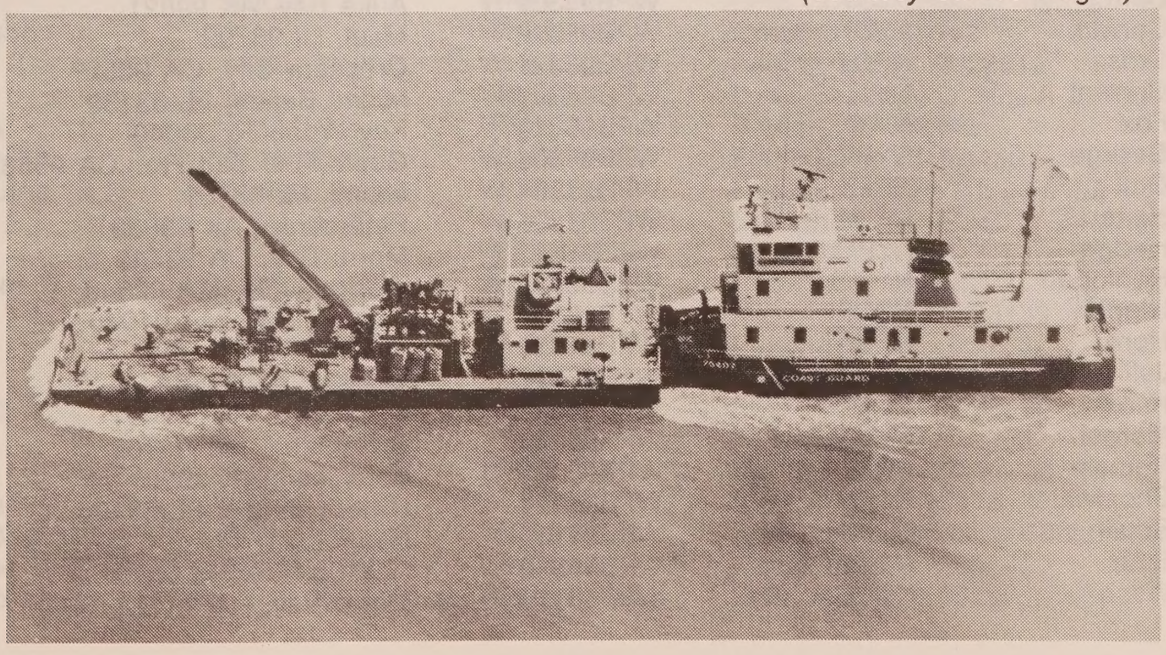
U.S. Coast Guard Cutter Frequencies and Modes

2003.0	USB	3253.0	USB
2082.5	USB	3382.0	USB
2093.0	USB	3387.0	RTTY
2182.0	USB #1	4081.6/	
2203.0	USB	4376.0	USB
2234.0	RTTY	4106.4/	
2243.5	RTTY	4400.8	USB
2328.0	RTTY	4125.0	USB
2442.0	RTTY	4134.3/	
2512.0	USB	4428.7	USB
2606.0	RTTY	4170.0 to	
2638.0	USB	4177.5	RTTY
2659.0	USB	4376.0	USB
2662.0	USB	4419.4	USB
2670.0	USB	5320.0	USB
2672.0	USB	5419.5	RTTY
2675.0	USB	5680.0	USB #2
2678.0	USB	6200.0/	
2680.0	RTTY	6506.4	USB
2683.0	USB	6206.2/	
2686.0	USB	6512.6	USB
2690.0	RTTY	6218.6	USB
2691.0	USB	6221.6	USB
2694.0	USB	6260.0 to	
2698.0	RTTY	6267.5	RTTY
2699.0	USB	6381.0	RTTY
2702.0	USB	6521.9	USB
2707.0	USB	7349.5	RTTY #3
2710.0	USB	8195.0/	
2738.0	USB	8718.9	USB
2748.0	USB	8241.5/	
2830.0	USB	8765.4	USB
3023.0	USB #2	8245.0	USB
3241.0	USB		
8295.0 to		16475.5/	
8297.1	RTTY	17248.4	USB
8343.5 to		16497.2/	
8355.0	RTTY	17270.1	USB
8768.5	USB	16534.4/	
9108.0	RTTY #3	17307.3	USB
9125.0	RTTY #3	16574.7/	
10136.0	RTTY #3	17347.3	USB
10166.0	RTTY #3	16660.0 to	
11434.0	RTTY #3	16671.5	RTTY
12342.4/		16693.0 to	
13113.2	USB	16694.5	RTTY
12379.6/		18195.5	RTTY #3
13150.4	USB	22015.5/	
12426.1/		22611.5	USB
13196.9	USB	22052.7/	
12491.0 to		22648.7	USB
12502.5	RTTY	22192.0 to	
12518.5	RTTY	22203.5	RTTY
12519.5	RTTY	22224.5	RTTY
15654.5	RTTY #3	27540.0	RTTY #3

NOTES:
#1 - International distress & calling
#2 - International Search and Rescue
#3 - Arctic/Antarctic Icebreakers

(Freq/freq) are duplex USB ship/shore. Some cutters use USB simplex on shore duplex frequencies. (Freq to freq) are multiple duplex RTTY channels. RTTY is usually 75/170R or 75/850R.

The USCGC Kanawha pushes a work barge loaded with buoys and other equipment on the lower Mississippi River (courtesy James Pogue)



What's in a Name?

With some exceptions, there is a method in assigning those colorful names to Coast Guard vessels. For example, 95' - 110' patrol boats utilize georgraphical capes (Cape Fox, Cape Horn), while 82' patrol boats will be named after points (Point Swift, Point Roberts); medium tugs are indian tribes (Chinook, Snohomish) and small tugs are ship rigging (Line, Shackle); buoy tenders are decidedly botanical (Red Birch, Sagebrush); high endurance cutters honor individuals (Sherman, Hamilton); and medium endurance cutters show their dedication (Steadfast, Durable).

U.S. COAST GUARD CUTTERS

(Includes new vessels not yet assigned to a port)

Name	Call	Hull No.	Home Port
Acacia	NODY	WLB406	Grand Haven, MI 49417
Acushnet	NNHA	WMEC167	Gulfport, MS 39501
Alert	NZVE	WMEC630	Cape May, NJ 08204
Anvil	NMFN	WLIC75301	Corpus Christi, TX 78401
Apalachee	NRKC	WYTM711	Baltimore, MD 21226
Aquidneck	NBTC	WPD1309	
Axe		WLIC85310	Mobile, AL 36615
Basswood	NODG	WLB388	Guam,FPO Seattle,WA 96661
Bayberry	NBKE	WLI65400	Seattle, WA 98199
Bear	NRKN	WMEC901	Portsmouth, VA 23703
Biscayne Bay	NRUS	WTGB104	St Ignace, MI 49781
Bittersweet	NODH	WLB389	Woods Hole, MA 02543
Blackberry		WLI65303	Southport, NC 28461
Blackhaw	NODI	WLB390	San Francisco, CA 94130
Bluebell	NODD	WLI313	Portland, OR 97217
Bollard		WYTL65614	New Haven, CT 06512
Boutwell	NYCQ	WHEC719	FPO Seattle, WA 98799
Bramble	NODK	WLB392	Port Huron, MI 48060
Bridle		WYTL65607	SW Harbor, ME 04679
Bristol Bay	NRLY	WTG102	Detroit, MI 48207
Buckthorn	NADT	WLI642	Sault Ste Marie, MI 49783
Buttonwood	NRPX	WLB306	Galveston, TX 77550
Campbell	NRDC	WMEC909	
Cape Carter	NJSJ	WPB95309	Auke Bay, AK 99821
Cape Corwin	NVUN	WPB95326	Maui, HI 96793
Cape Cross	NPDZ	WPB96321	Crescent City, CA 955??
Cape Current	NLIE	WPB95307	Miami Beach, FL 33139
Cape Fox	NIPO	WPB95316	Key West, FL 33040
Cape George	NYRW	WPB95306	Guam,FPO San Fran,CA 96662
Cape Gull	NRLZ	WPB95304	Miami, FL 33139
Cape Hatteras	NRDA	WPB95305	Petersburg, AK 99833
Cape Hedge	NZPO	WPB96311	Morro Bay, CA 93442
Cape Henlopen	NYOE	WPB95328	Woods Hole, MA 02543
Cape Higgon	NRDE	WPB95302	Glouchester, MA 01930
Cape Horn	NPUF	WPB95322	Ft Tilden, NJ 11695
Cape Jellison	NJTB	WPB95317	Seward, AK 99664
Cape Knox	NGBO	WPB95312	Charleston, SC 29401
Cape Morgan	NFLW	WPB95313	S Portland, ME 04106
Cape Romain	NLBB	WPB95319	Ketchikan, AK 99901
Cape Shoalwater	NSDT	WPB95324	Riviera Beach, FL 33404
Cape Small	NCFQ	WPB95300	Hilo, HI 96720
Cape Starr	NJVB	WPB95320	Atlantic City, NJ 08401
Cape Wash	NOBE	WPB95310	Morro Bay, CA 93442

Cape York	NRZY	WPB95332	Key West, FL 33040
Cape Upright	NBZF	WPB95303	Tybee, GA 31328
Catenary		WYTL65606	Glouchester City,NJ 08030
Capstan	NFKO	WYTL65601	Ft Belvoir, VA
Chase	NLPM	WHEC718	Boston, MA 02109
Chena		WLR75409	Hickman, KY 42050
Cherokee	NNGP	WMEC165	Norfolk, VA 23520
Cheyenne	NGXJ	WLR75405	St Louis, MO 63111
Chilula	NPIN	WMEC153	Atlantic Beach, NC 28512
Chinook	NRKL	WYTM96	Portsmouth, VA 23703
Chippewa		WLR75404	Owensboro, KY 42301
Chock		WYTL65602	Portsmouth, VA 23703
Chokeberry		WLI65304	Crisfield, MD 21817
Cimarron		WLR65502	Buchanan, TN 38222
Citrus	NRPQ	WMEC300	Coos Bay, OR 97420
Clamp		WLIC75306	Galveston, TX 77550
Cleat		WYTL65615	Glouchester, NJ 08030
Clover	NRPK	WMEC292	Eureka, CA 95501
Confidence	NHKW	WMEC619	Pt Angeles, WA 98362
Courageous	NCRG	WMEC622	Key West, FL 33040
Cowslip	NAFO	WLB277	Portsmouth, VA 23703
Dallas	NPCR	WHEC716	FPO Governors Is,NY 09567
Dauntless	NDTS	WMEC624	Miami Beach, FL 33139
Decisive	NUHC	WMEC629	St Petersburg, FL 33?
Dependable	NOWK	WMEC626	Panama City, FL 32401
Diligence	NMUD	WMEC616	Kay West,FL 32925
Dogwood	NUNA	WLR259	Pine Bluff, AR 71611
Durable	NRUN	WMEC628	Brownsville, TX 78521
Eagle	NRCB	WIX327	New London, CT 06320
Edisto	NLKY	WPB1313	
Elderberry	NUKD	WLI65401	Petersburg, AK 99833
Escanaba	NNAS	WMEC907	
Escape	NBPG	WMEC6	Charleston, SC 29408
Evergreen	NRXD	WMEC295	New London, CT 06320
Farallon	NABK	WPB1301	Miami Beach, FL 33139
Fir	NRYR	WLB212	Seattle, WA 98199
Firebush	NODL	WLB393	FPO Seattle, WA (Kodiak, AK)
Foreward	NICB	WMEC911	
Gallatin	NJOR	WHEC721	FPO Governorsls,NY 09570
Gasconade		WLR75401	Omaha, NB 68112
Gentian	NRPI	WLB290	Atlantic City, NC 28512
Glacier	NAAO	WAGB4	Long Beach,FPO SF,CA 96666
Hamilton	NMAG	WHEC715	Boston, MA 02109
Hammer	NNWM	WLIC75302	Fort Pierce, FL 33450
Harriet Lane	NHNC	WMEC903	Portsmouth, VA 23703-2199
Hatchet		WLIC75309	Galveston, TX 77550
Hawser		WYTL65610	New York, NY 10004
Hornbeam	NODM	WLB394	Cape May, NJ 08204
Hudson	NCWX	WLIC801	Miami Beach, FL 33139
Ingham	NRDL	WLEC35	Portsmouth, VA 23703
Iris	NODN	WLB395	Astoria, OR 97103
Ironwood	NRPN	WLB297	FPO Seattle, WA 98799 Kodiak, AK
Jarvis	NAQD	WHEC725	Honolulu,FPO SF,CA 96669
Kanawha		WLR75407	Memphis, TN 38173
Katmai Bay	NRLX	WTGB101	Sault Ste Marie,MI 49783
Kennebec	NRDJ	WLIC802	Portsmouth, VA 23703
Kickapoo		WLR75406	Vicksburg, MS 39180

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Lantana	NRQX	WLR80310	Natchez, MS 34120
Laurel	NRPJ	WLB291	San Pedro, CA 90731
Legare	NRPM	WMEC912	
Line		WYTL65611	New York, NY 10004
Lipan	NBOZ	WMEC85	Key West, FL 33040
Mackinaw	NRKP	WAGB83	Cheboygan, MI 49721
Mallet	NODO	WLIC75304	Corpus Christi, TX 78401
Mallow		WLB396	Honolulu,FPO SF,CA 96672
Maninicus	NDIS	WPB1315	
Manitou	NA5P	WPB1302	Miami Beach, FL 33139
Mariposa	NODP	WLB397	Detroit, MI 48207
Matagorda	NAYM	WPB1303	Miami Beach, FL 33139
Maui	NBEI	WPB1304	Miami Beach, FL 33139
Mellon	NDIT	WHEC717	FPO Seattle, WA 98799
Messenger		WYTM85009	Baltimore, MD 21226
Mesquite	NRPW	WLB305	Charlevoix, MI 49720
Midgett	NHWR	WHEC726	Alameda,FPO SF,CA 96672
Mobile Bay	NRUR	WTGB103	Sturgeon Bay, WI 54235
Mohawk	NRUF	WMEC913	
Mohican	NRKI	WYTM73	Portsmouth, VA 23703
Monhegan	NEGS	WPB1305	
Morgenthau	NDWA	WHEC722	Alameda,FPO SF,CA 96672
Morro Bay	NRWY	WTGB106	Yorktown, VA 23690-5000
Munro	NGDF	WHEC724	Honolulu,FPO SF,CA 96672
Muskingum		WLR75402	Sallisaw, OK 74955
Mustang	NJSH	WPB1310	
Naushon	NEWR	WPB1311	
Northland	NLGF	WMEC904	Norfolk, VA 23511
Neah Bay	NRUU	WTGB105	Cleveland, OH 44114
Northwind	NRFJ	WAGB282	Wilmington,NC 28402
Nunivac	NHPX	WPB1306	
Obion		WLR65503	St Louis, MO 63111
Ocracoke	NGBL	WPB1307	
Osage		WLR65505	Sewickly, PA 15143
Ouachita		WLR65501	E Chattanoooga, TN 37416
Pamlico	NAYE	WLIC800	New Orleans, LA 70117
Papaw	NRPZ	WLB308	Charleston, SC 29401
Patoka		WLR75408	Greenville, MS 38701
Pendant		WYTL65608	Boston, MA 02109
Penobscot Bay	NIGY	WTGB107	
Petrel	NACN	WSES-4	Key West, FL 33040
Plantree	NRPY	WLB307	FPO Seattle,WA 98799
			Juneau, AK
Point Arena	NJKT	WPB82346	Norfolk, VA 23520
Point Baker	NIQK	WPB82342	Port Aransas, TX 78373
Point Barnes	NLVA	WPB82371	Ft Pierce,FL 33449
Point Barrow	NUFN	WPB82348	Monterey, CA 93940
Point Batan	NAKH	WPB82340	Point Pleasant,NJ 08742
Point Bennett	NAVH	WPB82351	Port Townsend, WA 98368
Point Bonita	NSMF	WPB82347	Woods Hole, MA 02543
Point Bridge	NLDW	WPD82338	Marina del Rey, CA 90291
Point Brower	NMEX	WPB82372	San Diego, CA 92106
Point Brown	NKFW	WPB82362	Norfolk, VA 27968
Point Camden	NKIG	WPB82373	San Pedro, CA 90731
Point Carrew	NNZL	WPB82374	San Pedro, CA 90731
Point Charles	NJGJ	WPB82361	Cape Canaveral, FL 32920
Point Chico	NIOO	WPB82339	Bodega Bay, CA 94923
Point Countless	NVOA	WPB82335	Port Angeles, WA 98362

Point Divide	NRJG	WPB82337	Corona del Mar, CA 92625
Point Doran	NLLX	WPB82375	Everett, CA 98201
Point Estero	NZON	WPB82344	Gulfport, MS 39501
Point Evans	NCCE	WPB2354	Long Beach, CA 90803
Point Francis	NDCH	WPB82356	Highland, NJ 07732
Point Franklin	NYVC	WPB82350	Cape May, NJ 08204
Point Glass	NCNR	WPB82336	Gig Harbor, WA 98335
Point Hannon	NCNP	WPB82355	West Jonesport, ME 04649
Point Harris	NKEQ	WPB82376	Honolulu, HI 96850
Point Herron	NUEL	WPB82318	Babylon, NY 11702
Point Heyer	NVRC	WPB82369	San Francisco, CA 94130
Point Highland	NWNO	WPB82333	Chincoteague, VA 23336
Point Hobart	NSWA	WPB82377	Oceanside, CA 92054
Point Hope	NKJX	WPB82302	Sabine, TX 77655
Point Huron	NECA	WPB82357	Norfolk, VA 23520
Point Jackson	NSGB	WPB82378	Woods Hole, MA 02543
Point Judith	NJIL	WPB82345	Santa Barbara, CA 93109
Point Knoll	NTKD	WPB82367	New London, CT 06230
Point Ledge	NDLK	WPB82334	Ft Bragg, CA 95437
Point Lobos	NSDA	WPB82366	Panama City, FL 32407
Point Lookout	NELL	WPB82341	Morgan City, LA 70380
Point Martin	NRQJ	WPB82379	Atlantic Beach, NC 28512
Point Monroe	NBRM	WPB82353	Freeport, TX 77541
Point Nowell	NLEZ	WPB82363	Port Isabel, TX 78578
Point Richmond	NWGM	WPB82370	Anacortes, WA 98221
Point Roberts	NFDU	WPB82332	Mayport, FL 32067
Point Sal	NBEN	WPB82352	Grand Isle,LA 70358
Point Spencer	NXFN	WPB82349	New Orleans, LA 70117
Point Steele	NGYD	WPB82359	Ft Myers Beach, FL 3393?
Point Stuart	NFIJ	WPB82358	San Diego, CA 92106
Point Swift	NLBI	WPB82312	Clearwater, FL 33515
Point Thatcher	NMDS	WPB82314	Sarasota, FL 33578
Point Turner	NICC	WPB82365	Newport, RI 02840
Point Verde	NZZF	WPB82311	Pensacola, FL 32?
Point Warde	NUIH	WPB82368	San Juan, PR 00903
Point Wells	NTDG	WPB82343	Montauk, NY 11954
Point Whitehorn	NMEI	WPB82364	St Thomas, VI 00802
Point Winslow	NHMV	WPB82360	Eureka, CA 45501
Polar Sea	NRUO	WAGB11	FPO Seattle, WA 98799
Polar Star	NBTM	WAGB10	FPO Seattle, WA 98799
Primrose	NRZT	WLIC316	Atlantic Beach, NC 285?
Rambler	NRPO	WLIC298	Charleston, SC 29401
Raritan	NRPS	WYTM93	New York, NY 10004
Red Beech	NJLE	WLM686	Governors Is, NY 10004
Red Birch	NGFH	WLM687	Baltimore, MD 21226
Red Cedar	NPDC	WLM688	Portsmouth, VA 23703
Red Oak	NPKF	WLM689	Glouchester, NJ 08030
Red Wood	NDTE	WLM685	New London, CT 06320
Reliance	NJPJ	WMEC615	Cape Canaveral, FL 3293?
Resolute	NRLT	WMEC620	Astoria, OR 97103
Rush	NLVS	WHEC723	Alameda,FPO SF,CA 96677
Sagebrush	NODR	WLB399	San Juan, PR 00903
Saginaw	NJOY	WLIC803	Mobile, AL 36615
Salvia	NODS	WLB400	Mobile, AL 36690
Sangamon		WLR65506	Peoria, IL 61601
Sanibel	NDCK	WPB1312	
Sassafras	NODT	WLB401	Honolulu,FPO SF,CA 96678
Scioto		WLR65504	Keokuk, IA 52632

COAST GUARD

Sea Hawk	NEHM	WSES-2	Key West, FL 33040
Sedge	NODU	WLB402	Homer, AK 99603
Seneca	NFMK	WMEC906	
Sepelo	NHKD	WPD1314	
Shackle		WYTL65609	S Portland, ME 04106
Shearwater	NKBT	WSES-3	Key West, FL 33040
Sherman	NMMJ	WHEC720	Alameda,FPO SF,CA 96678
Sledge	NSAD	WLIC75303	Baltimore, MD 21226
Smilax	NRYN	WLIC315	Brunswick, GA 31521
Snohomish	NRKR	WYTM72	S Portland, ME 04106
Sorrel	NRZI	WLB296	New York, NY 10004
Spar	NODV	WLB403	S Portland, ME 04106
Spencer	NWHE	WMEC905	Boston, MA 02109
Spike		WLIC75308	Mayport, FL 32267
Steadfast	NSTF	WMEC623	St Petersburg, FL 33701
Storis	NRUC	WMEC38	Kodiak, AK 99619
Sumac	NTLZ	WLR311	St Louis, MO 63111
Sundew	NODW	WLB404	Duluth, MN 55802
Sweetbriar	NODX	WLB405	FPO Seattle,WA 98799
			Cordova, AK
Sweetgum	NRQW	WLB309	Mayport, FL 32267
Swivel		WYTL65603	Rockland, ME 04841
Tahoma	NCBE	WYTL65604	Crisfield, MD 21817-0430
Tamaroa	NNGR	WMEC166	Governors Is, NY 10004
Tampa	NIKL	WMEC902	Portsmouth, VA 23703
Tackle		WYTL65504	Crisfield, MD 21817
Taney	NRDT	WHEC37	Portsmouth, VA 23703
Thetis	NYWL	WMEC910	
Thunder Bay	NRTB	WTGB108	Seattle, WA 98174
Towline		WYTL65605	Bristol, RI 02809
Unimak	NBYG	WHEC379	New Bedford, MA 02740
Ute	NBXL	WMEC76	Key West, FL 33040
Valiant	NVAI	WHEC621	Galveston, TX 77550
Vashon	NJEH	WPB1308	
Venturous	NVES	WMEC625	San Pedro, CA 90731
Vise		WLIC75305	St Petersburg, FL 33701
Vigilant (MARS NNNOCYU)	NHIC	WMEC617	New Bedford, CT 33701
Vigorous	NQSP	WMEC627	New London, CT 06320
Wedge		WLIC75307	New Orleans, LA 70117
Westwind	NLKL	WAGB281	Mobile, AL 36633
White Heath	NAQE	WLB545	Boston, MA 02109
White Holly	NAOY	WLM543	New Orleans, LA 70117
White Lupine	NARO	WLM546	Rockland, ME 04841
White Pine	NODE	WLM547	Mobile, AL 36690
White Sage	NAPC	WLM544	Woods Hole, MA 02543
White Sumac	NAED	WLM540	St Petersburg, FL 33701
Wire		WYTL65612	New York, NY 10004
Woodrush	NODZ	WLB407	Sitka,FPO Seattle,WA 98799
Wyaconda		WLR75403	Dubuque, IA 52001
Yocona	NNHB	WMEC168	Kodiak, AK 99619

Canadian Coast Guard

Frequency: 6292.5
Mode: CW

Canadian CG Coast Stations

Single Sideband (SSB)

VAF	Alert Bay, NWT	2054 2458 4125
VAG	Bull Harbour, BC	2054
VFC	Cambridge Bay, NWT	2558 4363.6
VOK	Cartwright, Lab	2514 2582 2598 2738
VCA	Charlottetown, PEI	2530 2582
VAP	Churchill, Man	2582 4376
VOO	Comfort Cove, NFLD	2538 2582 2598
VAC	Comox, BC	2054
VFU 6	Coppermine, NWT	4363.6
VFU	Coral Harbour, NWT	2514 4376
VFF 3	Fort Chipewyan, Alta	5803
VFF 6	Fort Simpson, NWT	5803
VFF	Frobisher Bay, NWT	2582 4376 6335.5 (CW) 6512.6 8753 13100.8 17335.2
VFR	Resolute, NWT	6438(CW)
VFZ	Goose Bay, Lab	2514 2582 2598 4379.1
VCN	Grindstone, Magdelene Is, PQ	2514 2582 2598
VCS	Halifax, NS	2514 2582 2598 4410.1 6518.8 8787.1 13138 17242.2
VBJ 20	Halifax Traffic, NS	2134 2237
VFH 3	Hay River, NWT	5803
VAL	Inoucdjouac, PQ	2582
VFA	Inuvik, NWT	2558 4363.6 5803 6335.5
VAW	Killineck, NWT	2514 2582 4376
VCF	Mont Joli, PQ	2582
VFN	Montreal, PQ	2514
VFN 8	Norman Wells, NWT	5803
VAV	Poste della Balein,PQ	2582
VCC	Quebec, PQ	2514 2582
VFR	Resolute, NWT	2582 4376 8793.3
VCG	Riviere au Renard,PQ	2514 2582 2598
VCM	St Anthony, NFLD	2514 2582 2598
VON	St John's, NFLD	2538 2514 2582 2598
VCP	St Lawrence, NFLD	2514 2582 2598
VAH	Sandspit, BC	2054
VCK	Sept Iles, PQ	2514 2582
VOJ	Stephenville, NFLD	2514 2582 2598
VCO	Sydney, NS	2530 2582 2598
VAE	Tofino, BC	2054 2458 4125
VYO 21	Tuktoyaktuk, NWT	5803
VAI	Vancouver, BC	2054 4385.3 6158.8 8737.5 13119.4 17254.6 22654.9
VAK	Victoria, BC	2054 2458
VAU	Yarmouth, NS	2538 2582 2598

CW

VFF	Frobisher Bay, NWT	4236.5 6493 8443 12671
VCS	Halifax, NS	4285 6491.5 8440 12874 16948.5 22387
VAI	Vancouver, BC	4235 6493 8453 12867 17175

Radiotelex

VCS	Halifax, NS	4353 6497.5 8716.5 13090.5 17212.5 22590

Radiofacsimile

VFF	Frobisher Bay, NWT	3253 7710
VFR	Resolute, NWT	3253 7710
Syndey, Nova Scotia (ship)		10157

BC Telephone Coast Stations

Sideband

CFW 4	Prince Rupert, BC	2060 2590
CFW	Vancouver, BC	2538 2558 4410.1 6515.7 8759.2

Canadian Coast Guard Ship Alexander Henry in Lake Ontario

COAST GUARD

Canadian Forces Coast Station

CW

CFH	Halifax, NS	4255 6430 8697 12726 16926.5

Frequency Pairs: Ship - Shore

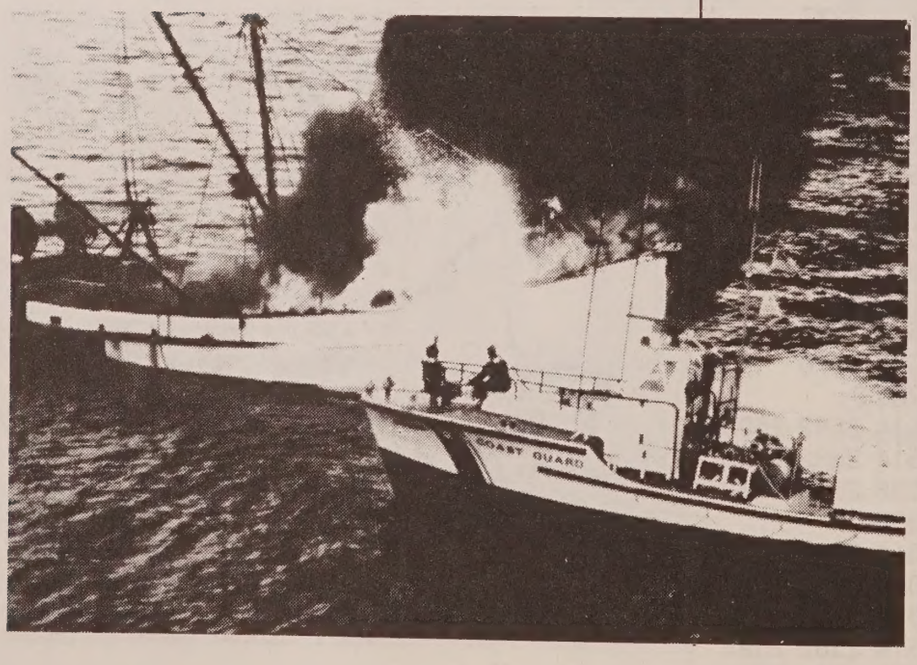
Coast	Ship
2054	2054
2134	2134
2237	2237
2458	2340
2530	2815
2538	2142
2514	2118
2558	2142
2582	2206

Coast Guard Intership

4125	6221.6
8284.4	12424.5

Northwest Territory Ship to Shore

4069.2	5803
4260	5875.5
4363.6	5940
5680	



Intership Simplex

2003	Gulf of St. Lawrence & River
2040	Pacific
2638	
2134	
2237	
2318	Pacific
2738	
2083.9	

Private Ship - Shore

2066.5 2094.4

Government Use

2010.4 2104.9

Ice Breakers

St. Lawrence Seaway

6292.5

U.S. Coast Guard VLF Frequencies

Several discrete frequencies in the 400-500 kHz range are utilized by the Coast Guard for CW communications over the Atlantic and Pacific oceans.

416	NOJ
427	NMF
432	NMG
440	NMA, NMO
448	NMC
450	CW, NOV
466	Ships, NMN, NMR, NRV
470	NOJ
472	NMF, NMC
500	Distress (calling)
518	SITOR

Federal Emergency Management Agency

(FEMA)

Civil Defense National Radio System

(CDNARS)

FEMA National Radio System (FNARS)

Formerly the Defense Civil Preparedness Agency (DCPA), FEMA's prime responsibility is to assure continuity in government during an enemy attack, as well as to respond to natural disasters as declared by the President. Civilian employees man the facilities.

VIP relocation installations, such as those deep in Mount Weather, Berryville, VA (Blue Ridge Mountains, Rt 601 between Paris and Bluemont, VA), are part of this nationwide complex. A sophisticated USB/RTTY (100WPM/85Hz) network has been established to support this vital program.

Slow-speed, encrypted CW is also transmitted. ATS-3 satellite is also used. Communications security (COMSEC) is observed when discussing critical materials for stockpiling in case of aggression.

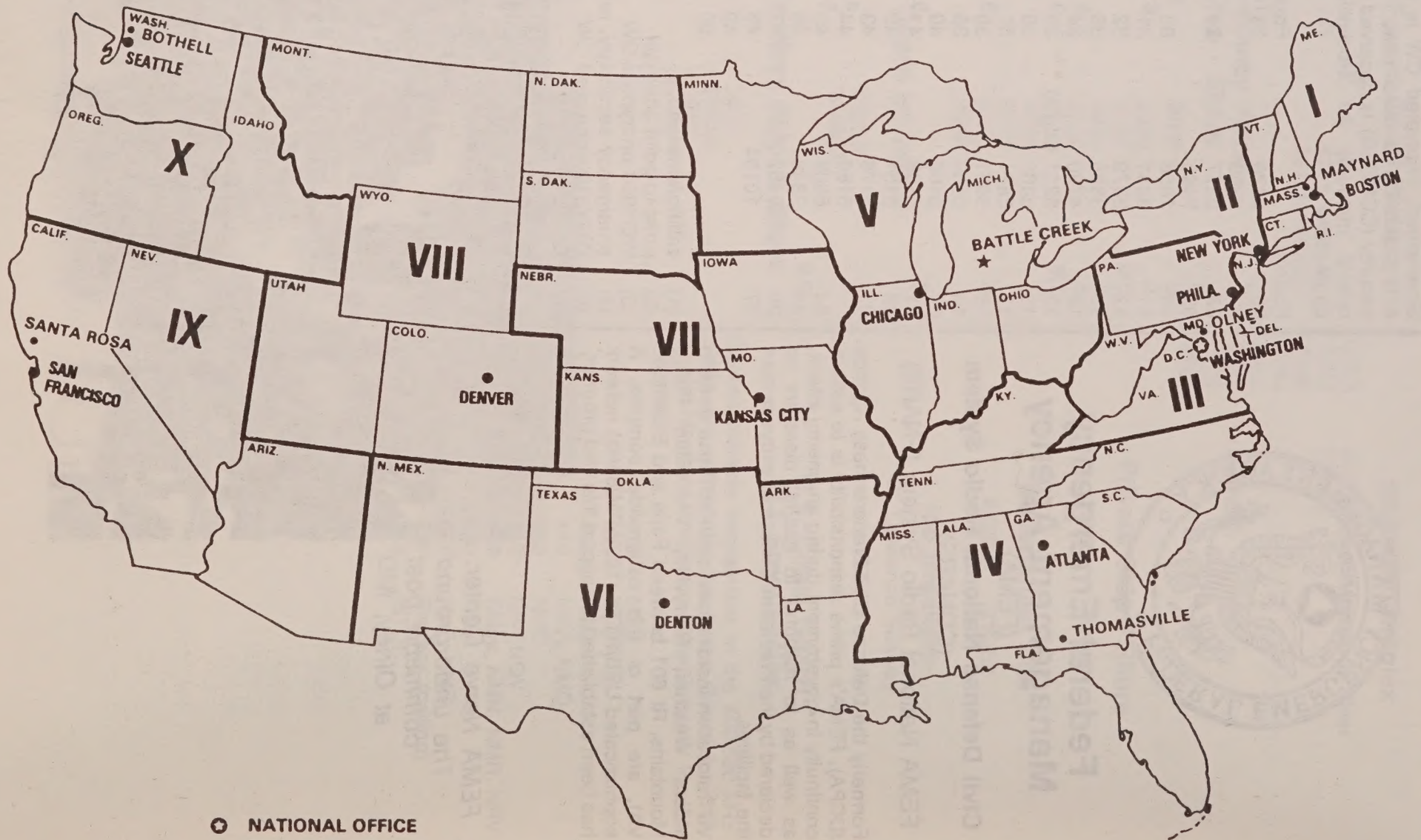
Foxtrot...		Foxtrot...	
06	2320	28[1,6]	10493
07[6]	2360		(day)
08	2377	29	10588
09[6]	2445		10871?
10[6]	2658	80	11721
11[5]	3341	31[6]	11801
12[3,6]	3379	32	11957
13[6]	3388	33	12009
14[5]	4780	34[2]	12216
15[1,6]	5211 (night)	35[3]	14450
16	5402	36	14776
17	5821	37	14837
18[6]	5961	38[3]	14886
19	6049	39	14899
20	6106	40	14908
21[6]	6108	41[5]	16201
22	6151	42	16430
23	6176	43	17519
	6180	44[4]	17649
24	6809	45[5]	18744
25[2,6]	7348	46	19757
26	9462	47	19969
27	10194	48	20027
		49	12129?
		50	20063

(1) calling/emergency
(2) point-to-point alternate
(3) WGY908 encrypted CW
(4) emergency secondary, region 9 & 10
(5) WGY912 encrypted CW
(6) DOE authorization

FEMA Nerve Center: The underground command post at Olney, MD

FEDERAL EMERGENCY MANAGEMENT AGENCY

REGIONAL BOUNDARIES WITHIN THE CONTERMINOUS UNITED STATES



Test Net

All tests are conducted at 1600 UTC (1500 during Daylight Savings Time)

Working hours only, day-to-day all states monitor and work 10493. During any disaster, the affected state is the authority.

Mon,Thurs,Fri:
Olney net control to all regions (USB)/10493
1st Tues in January, April, July, October: net control WGY903
1st Tues in February, May, August, November: net control WGY906
1st Tues in March, June, September, December: net control WGY904
2nd Tues in March, June, September, December: net control WGY905
Wed: all regions work each other (no net control station)

FEMA Regions

Reg Callsign ID/Location

WGY900 Ops Support Warning Division, FEMA HQ, Wash DC

1 WGY901 MAYNARD, MASSACHUSETTS
WGY921 Concord, NH
WGY931 Montpelier, VT
WGY941 Augusta, ME
WGY951 Hartford, CT
WGY961 Framingham, MA
WGY971 Providence, RI

2 WGY902 NEW YORK CITY, NEW YORK
WGY932 St Thomas, VI
WGY942 Albany, NY
WGY982 North Trenton, NJ
WGY992 San Juan, Puerto Rico

3 WGY903 OLNEY, MARYLAND
(Net Control Station)
WGY923 Harrisburg, PA
WGY933 Pikesville, MD
WGY943 Charlestown, WV
WGY953 Delaware City, Delaware
WGY963 Richmond, VA
WGY983 Washington, D.C.
WGY933 Charlottesville,VA

4 WGY904 THOMASVILLE, GEORGIA
(3rd alternate NCS)
WGY914 Canal Zone, (Balboa Hts)
WGY924 Nashville, TN
WGY934 Columbia, SC
WGY944 Atlanta, GA
WGY954 Montgomery, AL
WGY964 Jackson, MS
WGY974 Tallahassee, FL
WGY984 Raleigh, NC
WGY994 Frankfurt, KY

5 WGY905 BATTLE CREEK, MICHIGAN
(4th alternate NCS)
WGY925 Madison, WI
WGY935 St Paul, MN
WGY945 Columbus, OH
WGY955 Springfield, IL
WGY965 Indianapolis, IN
WGY975 Lansing, MI

6 WGY906 DENTON, TEXAS
(2nd alternate NCS)
WGY926 Oklahoma City, OK
WGY936 Santa Fe, NM
WGY946 Baton Rouge, LA
WGY956 Austin, TX
WGY966 Conway, AR

7 WGY907 KANSAS CITY, MISSOURI
WGY947 Des Moines, IA
WGY957 Lincoln, NB
WGY977 Jefferson City, MO
WGY997 Topeka,KS

8 WGY908 DENVER, COLORADO
(1st alternate NCS)
WGY928 Pierre, SD
WGY938 Cheyenne, WY
WGY948 Bismark, ND
WGY958 Helena, MT
WGY968 Golden, CO
WGY998 Salt Lake City, UT

9 WGY909 SAN FRANCISCO, CALIFORNIA
WGY929 Carson City, NV
WGY939 Sacramento, CA
WGY949 Phoenix, AZ
WGY959 Honolulu, HI

10 WGY910 BOTHELL, WASHINGTON
WGY920 Boise, ID
WGY930 Olympia, WA
WGY940 Salem, OR
WGY960 Soldotna, AK
WGY970 Juneau, AK
WGY980 Alcantra, AK

WGY990 Moses Lake, WA

WGY911 Telecommunications Management; FEMA HQ, Wash DC

WGY912 VIP Relocation Site, Mt. Weather, VA (slow encrypted CW sent 3367.4 3380 9121.8 10870.8 14887)

WGY915 National Communications System, Arlington, VA (Possibly utilizing Warrenton/Remington transmitting facilities)

VIP Support Facilities

Ft Myer, VA	WAR21
Ft Belvoir	WAR22
Hagerstown, MD	WAR30
Mt Weather, VA	WAR42
Mercersburg,PA	WAR45
Ft Richie, MD	WAR46
Boonsboro, MD	WAR47

DOE Installations on this net

KAL22	Savannah River, South Carolina
KAL23	Oak Ridge, Tennessee
KAL24	Washington, DC (Headquarters)
KGO45	Rocky Flats, Colorado

Nuclear Regulatory Commission (NRC)

Many FEMA channels are shared with other agencies. WGY912 has been heard testing in USB on USAF/SAC channels "Bravo Uniform" (3113 kHz). The NRC has access to FEMA channels for point-to-point administrative communications among the following NRC regional headquarters.

Reg.	Location
1	Bethesda, MD King of Prussia, PA
2	Atlanta, GA
3	Glen Ellyn, IL
4	Arlington, TX
5	Walnut Creek, CA

Federal Highway Administration

Emergency Communications System

(FHWA ECS)

Linking regional and field offices nationwide, the FHWA net is intended to inform DOT officials of major occurences, accidents and catastrophes involving the nation's highways.

A typical radio installation utilizes a Sunair GSB-900DX 100W transceiver with GSL-1900A 1kW linear amplifier on USB into a CGU-1935 antenna coupler and a 37 foot whip antenna, and Dovetron MPC-1000R terminal with Extel printer (DOT system) or Model 43 printer (FHWA system) for 110/300 baud (850 Hz shift) ASCII.

Practice drills are held March, June, September and December from 1700-2131 UTC, Wednesday and Thursday, with participation from SHARES and other DOT agencies including FAA and Office of Emergency Transportation (OET).

By reciprocal agreement, FHWA stations have been heard checking into USAF MARS and FEMA networks.

Designators and Frequency Assignments (kHz)

F1	3199.5	F28	7743
F2	5255	F29	7821
F3	7419	F30	9169
F4	9197	F31	9185
F5	10891	F32	9930
F6	12158	F33	10225
F7	14461	F34	10918
F8	16211.5	F35	11045
F9	19223	F36	11518.7
F10	3304.5	F37	11605
F11	3329.5	F38	12064.5
F12	3395	F39	12094.5
F13	4572.5	F40	12171
F14	4821	F41	12178.7
F15	4965	F42	13434
F16	4902	F43	13493
F17	5024.5	F44	14953
F18	5031	F45	15910
F19	5330	F46	15969
F20	5350	F47	15981
F21	5424	F48	16330
F22	5749	F49	17525
F23	5755.5	F50	18403
F24	5885	F51	18716
F25	7669.5	F52	19934
F26	7726.5	F53	20095
F27	7736	F54	20330

F55	20843	F59	24793
F56	22926	F60	25490
F57	22975	F61	26703
F58	24040	F62	26905

Additional: 5009.5 7375 7583.5 9076 11029.5 17422.5

FAA frequencies for FHWA check-in: 4056.5 7476.5 8126.5

Regions and Call Signs

The FHWA ECS system is broken into 10 regions following the FEMA plan as follows (*primary):

Call	Location	Assigned Channels
Region HQ 1/2		
WWJ40	Washington, DC (NCS)	1 2 3 4 5 6 7 8 9 10 13* 20 25 30 33
WWJ41	Cairo, NY (NCS)	
WWJ42	Providence, RI	
WWJ51	Montpelier, VT	
WWJ52	Albany, NY	
WWJ53	Trenton, NJ	
WWJ54	Concord, NH	
WWJ55	Taunton, MA	
WWJ56	Augusta, ME	
WWJ57	Wethersfield, CT	
Region 3		
WWJ43	Berkeley Springs,WV (NCS)	11 15 17 27 31*
WWJ58	Staunton, VA	
WWJ59	Montoursville, PA	
WWJ60	Beckley, WV	
WWJ61	Georgetown, DE	
WWJ62	Lavale, MD	
Region 4		
WWJ44	Dahlonega, GA (NCS)	7 12 14* 18 26 32* 34 35 48 50
WWJ63	Nashville, TN	
WWJ64	Orangeburg, SC	
WWJ65	Raleigh, NC	
WWJ66	Greenwood, MS	
WWJ67	Frankfort, KY	
WWJ68	Avondale, GA	
WWJ69	Defuniak Springs, FL	
WWJ70	Montgomery, AL	
Region 5		
WWJ45	Homewood, IL (NCS)	10 16 21 29* 30 36 41 45 49
WWJ71	Madison, WI	
WWJ72	Dundas, OH	
WWJ73	St. Paul, MN	
WWJ74	Cadillac, MI	
WWJ75	Indianapolis, IN	
WWJ76	Effingham, IL	
Region 6		
WWJ46	Worth, TX (NCS)	4 11 13 22 25* 37 42 43 46 51 53
WWJ77	Brownwood, TX	
WWJ78	Oklahoma City, OK	
WWJ79	Santa Fe, NM	
WWJ80	Baton Rouge, LA	
WWJ81	Arkadelphia, AR	
Region 7		
WWJ47	Kansas City,MO(NCS)	12 14 23* 28 31 35 41 47 49 52
WWJ82	Grand Isle, NE	
WWJ83	Jefferson City, MO	
WWJ84	Topeka, KS	
WWJ85	Ames, IA	
Region 8		
WWJ48	Lakewood, CO (NCS)	11 13 24 25 30* 34 42 43 48 50 54
WWJ86	Cheyenne, WY	
WWJ87	Cedar City, UT	
WWJ88	Pierre, SD	
WWJ89	Bismarck, ND	
WWJ90	Helena, MT	
WWJ91	Denver, CO	
Region 9		
WWJ49	Petaluma, CA (NCS)	6 7 10* 15 19 27* 32 35 38* 46 50 55 57 58 59 61
WWJ92	Redding, CA	
WWJ93	Carson City, CA	
WWJ94	Phoenix, AZ	
WWJ95	Lihue, HI	
Region 10		
WWJ50	Newport, OR (NCS)	12 16 18 26 32 33* 39 44 45 49 52 53 56 59 60 62
WWJ50A	Newport, OR (remote)	
WWJ96	Olympia, WA	
WWJ97	Salem, OR	
WWJ98	Shoshone, ID	
WWJ99	Juneau, AK	

Command Net (net control stations) utilize channels 1-9

Additional Call Signs

KWB406	DOT	Ames, IA
KWB407	DOT	Durango, CO
KWB408	DOT	Two Rock, CA
KTX20	DOT	Washington, DC

KCP63	FAA	Longmont, CO
KKU40	FAA	Kansas City, MO
KGD34	SHARES	Arlington, VA

Other check-ins have included WWH7, WWC9, WWJ6, WWJ7.

Department of Transportation

Emergency Radio System

Freq.	Ch.*	Freq.	Ch.*
3303	F1	11028	F6
5008	F2	13432.5	F7
7373.5	F3	17421	F8
7582	F4	4055	(FAA)
9074.5	F5	7475	(FAA)
		8125	(FAA)

*Channel numbers were being reassigned at this writing

Call Sign	Location
KIT88	National Communications System, Warrenton, VA
KTX20	DOT headquarters, Washington, DC
KWB236	Nashua, NH
KWB238	Harrisonburg, VA
KWB239	Hilliard, FL
KWB240	Rensselaer, IN
KWB405	Bryan, TX
KWB406	Ames, IA
KWB407	Durango, CO
KWB408	Two Rock, CA
KWB409	Ephrata, WA
WSX70	Kenai, AK

National Communications System (NCS)

Shared Resources (SHARES)

Established in 1961 by Presidential Order, The National Communications System (NCS) is a confederation of 23 federal departments and agencies. Their shared resources (SHARES) HF radio communications plan provides for a nationwide network using the combined radio assets of the federal government on a shared basis, enabling agencies of the federal government to exchange critical information.

USB communications have been heard on the folowing four frequencies: 7540, 10195, 11028 and 13933 kHz.

Call Sign	Agency	Location
KGD34	NCS	National Coordinating Center, Arlington, VA
KWB405	DOT	Bryan, TX
KWB406	DOT	Ames, IA
KWB407	DOT	Durango, CO
WWJ70	FHWA	Montgomery, AL
WWJ73	FHWA	St. Paul, MN
WWJ82	FHWA	Grand Isle, NE
WGY910	FEMA	Bothell, WA
KIJ44	FBI	Tampa, FL
KKJ67	FBI	Albuquerque, NM
KOG69	FBI	Butte, MT
KCP63	FAA	Longmont, CO
KAZ599	unknown	

Department of Energy (DOE)

Nuclear Transport Safeguard Network

Unmarked convoys carrying fissionable materials and nuclear weapons along Interstate 40 take elaborate precautions to thwart any attempt to gain access to their cargo. In addition, a shortwave network ties the mobile units to nuclear facilities across the nation.

Hourly check-ins may be heard using secure communications (SECOM) rolling-code speech inversion accompanied by data transmissions to the Eclipse computer system.

Channel	Frequency
*1	3335
2	5308
*3	5751
4	5947
*5	7700
6	8013.5
7	9918
*8	11555
9	14657
10	17397

** Only channels presently in use; Simulkeyed*

Control Points

KRF263	Albuquerque, NM (NCS)
KRF264	Idaho Falls, ID
KRF265	Belton, MO
KRF266	Cheltenham, MD (HQ)
KRF267	Savannah River, SC
KRF268	Los Alamos, NM
KRF269	Amarillo, TX

Nuclear Weapons Locations in the United States
Key
Air Force
Navy
Army
ICBM Missile Base and Field
Nuclear Weapons Design and Production (Dept. of Energy)
Map prepared by Center for Defense Information
WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
UTAH
COLORADO
ARIZONA
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
ILLINOIS
MICHIGAN
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
GEORGIA
FLORIDA
SC
NORTH CAROLINA
VIRGINIA
WV
PENNSYLVANIA
NY
MD
DEL
N.J.
CONN.
R.I.
MASS.
VT
N.H.
MAINE
D.C.
ALASKA
HAWAII
PUERTO RICO
Fairchild AFB
McChord AFB
Tridem Sub Base
Portland International Airport
Kingsley Field
Sierra Army Depot
Travis AFB
Alameda Naval Air Station
Lemoore Naval Air Station
George AFB
Norton AFB
Long Beach Station and Seal Beach Weapons Station
March AFB
San Diego Naval Base and North Island Air Station
Concord Weapons Station
Livermore Lab (Univ. of Calif.) Weapons Design
Castle AFB
Fresno Air Terminal
Nevada Test Site
Nellis AFB
Davis Monthan AFB
Hanford Reservation (Weapons Material) (United Nuclear/Rockwell)
Great Falls Intl. Airport
Malmstrom AFB
Mountain Home AFB
Idaho Lab. (Exxon) Weapons Material
Hill AFB
F. E. Warren AFB
Minot AFB
Ellsworth AFB
Grand Forks AFB
Hector Field
Rocky Flats Plant (Rockwell) Weapons Production
Kirtland AFB
Los Alamos Lab (Univ. of Calif.) Weapons Design
Sandia Lab (Western Electric) Weapons Design
Cannon AFB
McConnell AFB
Kansas City Plant (Bendix) Weapons Production
Whiteman AFB
Tinker AFB
Ft. Sill
Pantex Plant (Mason & Hanger) Nuclear Weapons Assembly
Dyess AFB
Carswell AFB
Blytheville AFB
Little Rock AFB
Barksdale AFB
Kelly AFB
Ellington AFB
Pearl Harbor Naval Base
West Loch Weapons Storage
Hickam AFB
Barbers Pt. Air Station
Wahiawa Weapons Storage
Eielson AFB
Galena Airport
King Salmon Airport
Adak Naval Station
Elmendorf AFB
Selfridge ANG Base
Wurtsmith AFB
K. I. Sawyer AFB
Niagara Falls Intl. Airport
Plattsburgh AFB
Loring AFB
Brunswick Air Station
Pease AFB
Griffiss AFB
Seneca Army Depot (Storage)
Ashtabula Plant (Reactive Metals) Weapons Material
Mound Lab. (Monsanto) Weapons Production
Fernald Plant (National Lead) Weapons Material
Portsmouth Plant (Goodyear) Weapons Material
Paducah Plant (Union Carbide) Weapons Material
Y-12 Plant (Union Carbide) Weapons Production
Arnold Air Force Base
Seymour Johnson AFB
Savannah River Plant (DuPont) Weapons Production
Charleston AFB
Charleston Naval Base and Weapons Station
Robins AFB
Moody AFB
King's Bay Sub. Base
Jacksonville Intl. Airport
Cecil Field N.A.S.
Tyndall AFB
Jacksonville Air Station
Newport Naval Station
Pinellas Plant (General Electric) Weapons Production
MacDill AFB
Homestead AFB
Roosevelt Roads Naval Station
Ohio
New London Sub Base
Earle Weapons Station
Atlantic City Airport
McGuire AFB
Yorktown Naval Weapons Station
Oceana Naval Air Station
Norfolk Naval Base
Langley AFB

Nuclear Materials Production and Storage Facilities

Point to Point Communications Networks

The Department of Energy utilizes USB radio communications to interlink many of their facilities.

Some of the installations are for the production of radioactive materials for the industry, medicine and defense, while others in more remote regions are for the storage of nuclear warheads.

Not all frequencies shown are in use, but all are assigned to the DOE.

Call	Location
KRR41	Fernald, OH
KAL22	Savannah River Plant, SC; Dupont Weapons Lab
KAL23	Oak Ridge, TN; Y-12 Plant (produces plutonium triggers for bombs); Union Carbide
KAL24	Washington, DC; BDF Facility
KAS22	Kansas City, MO
KKR39	Paducah, KY
KKR40	Piketon, OH
KMF43	Albuquerque, NM
KSJ87	Lemont, IL; Argonne National Lab
KIV25	St Petersburg/Brooksville, FL; G.E. Labs (makes neutron generators) Pinellas Plant
KBA63	Upton, NY; Brookhaven National Institute
KMU77	Livermore, CA; University of California, Lawrence Radiation Lab
KAY20	Richland, WA; Hanford Reservation - Rockwell Internat'l
KBW48	Idaho Falls,IA; Exxon - Idaho Weapons Lab
KBW49	Nevada; Weapons Test Site
KLJ87	New Mexico; Los Alamos Scientific Lab, University of Chicago
KGO45	Estes Park, CO; Rocky Flats Plant, Rockwell Internat'l
KBA62	Miamisburg, OH; Monsanto Chemical, Mound Lab
KLE39	Amarillo, TX; Pantex - Weapons Assembly Plant
KAD71	Hickam AFB, HI - Nuclear Defense Agency
KAN71	Mauna Loa, HI
KPA71	Maynard, MA

Frequencies

2287.5	6930.5	10555.5	17902.5
2446.5	6982.5*	10871.5	18417.5
2610.5	7349.5	11126.5	19791.5
2624	7355.5	11397.5	20405.5
4480.5	7429.5	12020.5	
4600	7465.5	12233.5	
4669.5	7690.5	13261.5	
4776.5	7723.5	13803.5	
4946.5	7767.5	14400.5	
5212.5	7840.5	15454.5	
5377.5	9115.5	16060.0	
6646.5	9359.5	16065.6	

* *NASA coordination*

U.S. Department of State

With transmitters located at Station C of the National Communications System (NCS), Warrenton Training Center, Remington, Virginia, the State Department uses secure H.F. as backup for their normal satellite links with American embassies worldwide.

This is also the primary site of the US-originated "spy numbers" transmissions. While occasional SSB signals are reported by listeners, the majority of diplomatic transmissions are CW or RTTY.

QRA marker beacons generally identify with the collective callsign KKN50, although discrete callsigns are actually assigned for individual frequencies ("SD," "RUES" and others). Underlined frequencies were recently reported.

Callsign	Freq
	4880
	4886
KKN32	6925.5
	6928
	7470
	10365
	10470
KKN41	10637
KKN42	11095
KKN43	12022.5
	12023
	12111.5
	12112
	13646
	14800 USB(SS)
KKN35	15492
KKN36	15540
	16355
	16363
KKN39	17390
	17605
	18460
	18700
KKN45	18525
	18700
KKN47	18972
KKN48	20365
	20720
	23862.5
KKN51	23863 (RTTY)
KKN49	23975
KKN52	23982.5
	26760

Probable Target Areas:

KKN44	Africa
KKN39/46/50	Central/S.America
KRH50/51	Europe
KWL90	Asia
KWS78	Middle East/N.Africa

U.S. Embassies Worldwide

Brussels, Belgium
Callsign: ONN31

4548	4808	4903	5110	5732
7726.5	10522	10680	11474	12126
13718	14367	14548	14824	16150
16420	17426	18348	20929	

La Paz, Bolivia
Callsign: KLA24 & KWR86

5270 6925 7517 8035 14945
20123

London, England (RTTY)
Callsign: KRH51

7315	7570	7867	9147	9437	9463
9785	9973	10740	11072	11635	13673
13788	13842	13942	14655	14930	15596
17512	19443	19445	19942	19945	23446

London, England (CW)
Callsign: KRH50

3310	4589	4626	5379
5426	6788.5	7520	7724
7727	7865	7875	10627
10680	10770	11070	11142
13813	14450	16150	16349
16458	20569	20571	

Accra, Ghana
Callsign: 9GV

14360

Athens, Greece (CW/RTTY)
Callsign: KWS78

3186	3822	3830	4435	4463
4468	4600	4910	5113	5270.5
5426	6978	7434	7620	7627
7640	7645	7652	7821	7816
7821	7822	8127	10255	10285
10310	11170	11220	11255	11653
12211.5	12268.5	12272	13776	14360
15704	15711	15780	16149.5	18143
18148	18152	18351	18400	18460.5
18480	18545	19571	23642	

Tehran, Iran (Closed)
Callsign: KWK50

7474 7555 7645 10790 15957

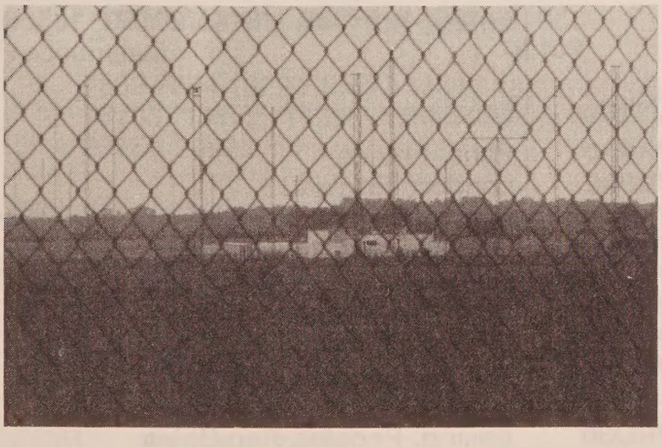
Clark AB, Philippines
Callsign: KWL90

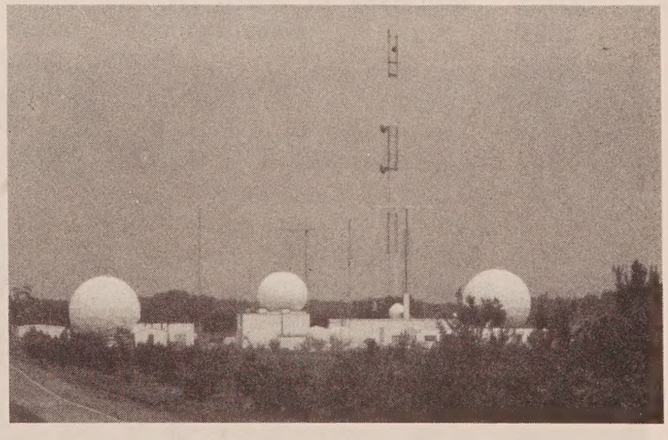
4048	5443	5822.5	6866.5	7662
9224	10464	10900	12210	13210
13485	13700	14616	14782	16623
17552				

Monrovia, Liberia
Callsign: KKN44

4886	5110	7634	7652	7830
11434	11474	11520	11635	11995
15917	16158.5	17426	18043	18348
20353	20929	20950	21300	23425

Dozens of towers and masts in Remington, VA, home of US-based "spynumbers" broadcasts and US State Department's KKN50 CW/RTTY transmissions.





Warsaw, Poland
Callsign: KWK97

9229 10621 11142 12105 14713 15664

Cairo, Egypt
Callsign: KWK95 (CW)

11142

Unidentified Locations

Callsign	Freq.
KWN90 (CW)	14360.5
KWM24 (RTTY)	19270
KWK94	14757.5
KWR94	18531
KRH70 (CW)	17426
KRM32 (RTTY)	4596
KRZ66 (CW)	14360
KWK94	14757.5
KWM24 (RTTY)	19270
KWN90 (CW)	14360.5
KWR94	18531

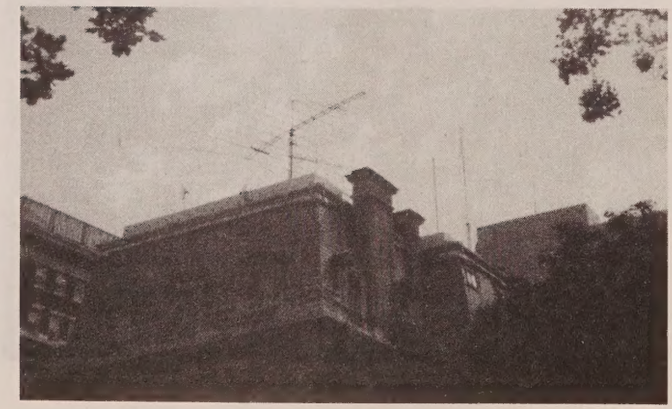
Embassies

Foreign Embassies in Washington, DC

The following frequencies are authorized for use by embassies and diplomatic offices of foreign governments in Washington, DC, for communications with their home offices. Virtually all transmissions will be CW or RTTY. It is common for users to move one or two kilohertz from their assigned frequencies.

Many Washington, D.C., embassies are moving toward satellite communications.

Antennas atop
Russian's lofty
embassy in Wash DC



5793.5	11448	15804	18430
5856	12067.5	16065	18808
6928*	12205	16125	18810
7321.5	13377.5	16242	18964
7719	13379	16255	19014.5
7887.5	13605	16275	19146
8135	13606.5	16392	19210
9040.5	13626*	16395	19458
9297	14353.5	17368	19900
9410	14355*	17375	20011
9440	14373	17450	20021
9862.5	14410	17570	20527.5
10640*	14500	17580	20920
10642.5	14649	17625	20958
10922.5	14912.5	18055	21764
11090	14989	18169	21773
11105	15519	18248.5	21811.5
11166	15542	18250	22960
11423	15704	18306.5	22966.5
			23995

*Embassy pool worldwide

Embassies Worldwide

Diplomatic relations among governments of the world are maintained on a daily basis through embassies, consulates and missions around the globe. Radiocommunications provide a vital link in this chain of peace.

The following listings have been compiled from off-the-air monitoring, private correspondence and official ITU records. Frequencies often vary 2-3 kilohertz from registered listings. Paired frequencies are indicated where known.

Algeria

Mode: CW/RTTY (50 baud)
Frequencies:
10100 10390 10703 10720 10730/11418 10096/11475 11005 13655 11463 14989 15918 16634 17368 18145/20150 18306 20190

Callsign	Location
7RP20	Paris, France
7RP30	London, England
7RP40	Brussels, Belgium
7RP50	Geneva, Switzerland
7RP70	Rome, Italy
7RP80	Bonn, Fed.Rep.Germany
7RP90	Madrid, Spain
7RQ20	Min of Foreign Affairs Algeria
7RQ30	Beijing, Peoples Rep.China
7RQ40	Pyongyang,Dem.P.Rep.Korea

7RQ70	Islamabad
7RQ80	Tehran, Iran
7RQ90	Ankara, Turkey
7RV20	Moscow,USSR
7RV30	Stockholm, Sweden
7RV40	Prague, Czechoslovakia
7RV50	Sofia, Bulgaria
7RV60	Belgrade, Yugoslavia
7RV70	Warsaw, Poland
7RV80	Berlin, German Dem.Rep.
7RX40	Tripoli, Libya
7RX60	Khartoum, Sudan
7RX70	Niamey, Niger
7RP50	Geneva, Switzerland
7RW20	Cairo, Egypt
7RW40	Amman, Jordan
7RW60	Baghdad, Iraq
7RW70	Kuwait
7RW90	Jeddah, Saudi Arabia
7RY20	Accra, Ghana
7RY40	Conakry, Guinea
7RY50	Dakar, Senegal
7RY60	Brazzaville, Congo
7RY80	Bamako, Mali
7RY90	Lagos, Nigeria
7RZ20	Washington, USA (also uses KNY35)
7RZ50	Abu Dhabi,U.Arab Emirates
7RZ90	Presidential Delegation
CME356	Havana, Cuba
ETN52	Addis Ababa (14525)

Angola

Location: Brussels

9942 17458 22848

Argentina

Frequency: 19330

Austria

Mode: RTTY/FEC (75 and 100 baud)
Frequencies:

7882 7894 10298 10423 13617 13805 14485 16133 16162 17556 19728 20480 20496 20750 20973

Callsign	Location
OEC	Vienna
OEC35	New Delhi, India
OEC36	Beijing, China
OEC44	Tel Aviv, Israel
OEC57	Pretoria, South Africa
OEC61	Rome, Italy
OEC64	Lagos, Nigeria
OEC72	Lisbon, Portugal

Belgium

Callsign	Location	
KNY33	Washington, DC	11105 16275 18810
	Ankara, Turkey	5546
	Warsaw, Poland	10322

Benin

Mode: RTTY (50 baud)

Freq	Call	Location
23964		Cotonou
21854.5		Brussels, Belgium
23964	CME388	Havana, Cuba

Bulgaria

Mode:RTTY/FEC (50 and 75 baud)
Sofia:

5924 9055 11122 11505 11531 12282 12306 13375-13382 13395 13916 14192 14382 16132 16608 16628 17507 18235 18362 18723 20808 20955 20929.5 23014

Location	Call	Freq
Addis Ababa, Ethiopia	ETR45	16450
Athens, Greece		9055
Baghdad, Iraq		19007
Beijing, China		23030 18365
Berlin, GDR		12420
Berne, Switzerland		14433
Bogota, Colombia		13955
Bonn, Fed.Rep.Germany		10804
Brussels, Belgium	ONN29	13380
Lisbon, Portugal		16066
Luanda, Angola		19042 20948
Madrid, Spain		20035
Prague, Czechoslovakia		9982
Rabat, Morocco		18941
Stockholm, Sweden		14374 13523
Tripoli, Libya		14482 16602
Tunis, Tunisia		13414
Washington, U.S.A.	KNY32	13605 18055 20164 22996

FEDERAL GOVERNMENT

China

Mode:RTTY (75 baud)
Beijing (BIM)

Location	Call	Frequencies
Aden, Yemen	70B469	16300 18320
Brussels, Belgium	ONN28	18037 21751
Gaborone, Botswana	A2D500	8185
Havana, Cuba	CME360-	10480 10760
		11550 12213
		18320
	369	18750 19920
		22818
Harare, Zimbabwe	ZEF81	16125 17385
		19250 20970
New Delhi, India	BXT7	18969
Warsaw, Poland	BXO44	5731 9955
		11455
Unidentified:	BXT1	14402 20492
		14393
	BXT2	18805
	BXT3	19878
	BXT5	10060 13310
		10096
	BXT7	18969
	BXT9	8917 15049
		23952
	BXT11	11362 13295
		18682
	BXT15	20012 20060
	BXT16	8334
	BXT18	14652 16595
		18685 16451
	BXT23	14562 19803
	BXT32	19501
	BXT39	10520
	BXT42	16542
	BXT44	19821
	BXT49	13314 13905
		19662
	BXT58	20247
	BXT71	13302
	BXM62	19542
	BXM72	13702
	BXM87	19808
	BXR75	10078
	BXP51	16551

Congo

Mode: CW and RTTY (50 baud/425 Hz; 75 baud/425 Hz)

Location	Call	Freq
Havana, Cuba	CME405	18054

Cuba

Mode:CW/RTTY (50 baud/425 Hz)
Frequencies:

8815 9130 10040 10045 0507 10620
10675 11230 12115 12225 12230 12235
12290 12295 12344 12980 13115 13275
13284 13290 13295 13300 13311 13316
13322 13333 13340 13345 13350 13371
13375 13380 13382 13385 13388 13390
13401 13856 13878 13920 13925 13930
13935 13940 13945 13950 13955 13965
13970 13975 13981 13985 13989 13991
14461 14472 14625 14730 14755 14818
14812 14823 14920 14945 14960 14989
14995 15040 15935 16010 16040 16145
16165 16170 16175 16316 16325 16355
16355 16358 16360 16370 16380 16405
16420 16425 16430 16470 17255 17485
17517 17720 17894 18030 18035 18040
18050 18110 18112 18115 18160 18185
18236 18420 18450 18454 18612 18628
18630 18638 18640 18645 18650 18785
19060 19065 19160 19250 19420 19425
19429 19585 19715 19765 19785 19810
19815 19850 19882 19945 19977 19985
19990 20044 20050 20130 20148 20155
20165 20419 20450 20419 20455 20610
20695 20700 20720 20735 20740 20765
20770 20775 20805 20810 20825 20830
20840 20850 20917 20940 20945 20868
20874 20880 20955 20990 21890 21965
21980 22030 22740 22830 23000 23181
23635 23860 23865 24806 25041

Call	Location	Frequencies
CLP1	Havana, Cuba	13284 13340
		13350 13385
		13390 13925
		13945 13955
		13975 13981
		13989 14920
		14989 16010
		16470 17894*
		18236 18454
		19060 19945*
CLP2	Panama	8815 12344
CLP4	Bissau, Guinea	
CLP5	Algiers, Algeria	
CLP6	Damascus, Syria	
CLP7	Brazzaville, Congo	
CLP8	Conakry, Guinea	20043.7
CLP9	Aden, Yemen	
CLP13		12290
CLP15	Cotonou, Benin	
CLP16	Malabo	13315.9
CLP18	Dar es Salaam, Tanzania	
CLP23	Lagos	

CLP25	Maputo,Mozambique	12115	
CLP33	Addis Ababa, Ethiopia		
CLP38	Paramaribo, Surinam		
CLP45	Luanda, Angola	13375	
CLP55	Georgetown,Guyana	12290	12230
		13115	13345
		14989	14995
		18040	
CLP65	Managua, Nicaragua	13940	
CLP67	Baghdad, Iraq		

** CLP1 Listening frequencies*

Czechoslovakia

Mode:RTTY (75 baud)
Prague (OMZ):
4900 5204 5250 6839.5 6871 7622.5 7690 7960 8129 9268 9278 10101 10705 11400 11500 13397.5 14650 16100 16180 16368 16395 16450 18300 18320 18400 19320 19330 20620 21810 22800 22820
Embassy Frequencies:
5305 5755 6860 7605 7620 7628 8130 9104 10567 10607 10618.5 14350 14355 14360 14370 14390 14400 14478 14498 14550 14560 14628 14650 14959 16378 18323 18362 18392 18500 18902 18909 19074 19458 19465 20622 20632 20707 20752 20778 20781 20788 20810 20880 20895 20900 20960 20970 20980 20990 22880 22886

Location	Call
Addis Ababa, Ethiopia	ETN40/ ETT90
Algiers, Algeria	3G5
Ankara, Turkey	3Q5
Baghdad, Iraq	7A1
Belgrade, Yugoslavia	
Beirut, Lebanon	3K5
Beijing, China	
Bonn,Fed.Rep.Germany	
Bucharest, Hungary	5F3
Cairo, Egypt	2C6
Conakry, Guinea	5Q3
Damascus, Syria	7T1
Hanoi,N.Vietnam; Nairobi, Kenya; Pyongyang	2F6
Havana, Cuba	7L1
Jakarta, Indonesia	
Kabul, Afghanistan	
London, England	3P5
Lagos, Nigeria	6C2
Luanda, Angola	
Maputo, Mozambique	
Moscow, USSR	5W3
Montreal, Canada	
New Delhi, India	
Paris, France	1S7
Phnom Penh, Kampuchea	6M2
Sofia, Bulgaria	
Tehran, Iran	2D6
Tirana, Albania	
Ulan Bator, Mongolia	
Warsaw, Poland	0MZ9
Washington, USA	KNY23
	7719 13377 14649 15704 15804 18430 19458 19468
Unidentified	2M8
	5Y3
	6M3

Denmark

Mode:SSB/RTTY (TOR-ARQ)
Frequencies:
7452 7462 13491 16401 18586 18592 26131

Call	Location
OZU25	Copenhagen
OZU30	Cairo, Egypt
OZU33	Tel Aviv, Israel
OZU34	Jeddah, Saudi Arabia
OZU35	Beijing, China
OZU37	Ankara, Turkey
OZU38	Lagos, Nigeria
OZU39	Nairobi, Kenya

Egypt

Mode:CW/TOR-ARQ

CW: 9997 15400 15600 16201
ARQ: 6726 6754 8217 8302 8932 10402 11250 13342 13352 13502 14652 14902 16302 16352 16562 16802 18014 18050 18062 18802 19002 19452 20002 20022 20038 20054 20102 20402 20792 23106

Location	Call	Freq
Amman		14652
Bucharest, Hungary		8302
Jeddah		13342
Kuwait		15014
Madrid, Spain		13507
Nairobi, Kenya		23001
Paris, France		20007
Prague, CSSR	OMZ26	16298.5
Washington,USA	KNY29	9297 11106 14353.5 18808

Ethiopia

19425 20375 20458

FEDERAL GOVERNMENT

Finland

Mode:SSB/RTTY
Frequencies:
7778 10737 10748 10886 13434 13914
14662 14694 14817 14926 14955 15727
15871 16135 17419 17444 17562 17576
17603 18762 18842 20125 20187 20259
20264 20177

Call	Location
OHU20	Helsinki
OHU21	Paris, France
OHU22	Bucharest, Roumania
OHU23	Tel Aviv, Israel
OHU24	Cairo, Egypt
OHU25	Beijing, China
OHU26	Belgrade, Yugoslavia
OHU27	Addis Ababa, Ethiopia (also ETN66)
OHU28	Warsaw, Poland
OHU30	Lagos, Nigeria
OHU31	Dar es Salaam
OHU32	Jeddah, Saudi Arabia
OHU33	Hanoi, Vietnam
OHU34	Lusaka, Zambia
OHU35	Tehran, Iran
OHU36	Baghdad, Iraq
OHU38	Tripoli, Libya
CME390-394	Havana, Cuba

France

Mode:RTTY (50 baud)
Paris (P6Z):
5125 9811 10725 10714 10732 10792 11572
13951 14485 15873 16260 18760 19632

Location	Call	Frequencies
Algiers, Algeria	H6L	10426 11046 11042 11406 12215 14548 16078 16082 16088
Brussels, Belgium	ONN27	8176 15996 21840
Belgrade,Yugoslavia	G8T	11573 14438 14442
Bucharest, Roumania	A9C	13946 19636
Budapest, Hungary	D6Z	10560 10755
Fort de France		16107
Jeddah	O6F	
Madrid, Spain	AND3	9052
Rabat, Morocco	J5W	14403
Tel Aviv, Israel	W5E	
Tunis, Tunisia	K4X	14400 14405
Warsaw, Poland	H7K/SRZ944	14417 14443 10707 10714 10730 11042 14548

East Germany (GDR)

Mode:RTTY (50, 75, 100 baud)
Berlin:

Y7A22	4020	Y7A59	14619
Y7A23	4480	Y7A60	14818
Y7A24	4840	Y7A61	15911
Y7A25	4880	Y7A62	15963
Y7A26	5830	Y7A63	16199
Y7A27	5868	Y7A64	16243
Y7A28	6706	Y7A65	16268
Y7A29	6803	Y7A66	16308
Y7A30	6974	Y7A67	16358
Y7A31	6987	Y7A68	17126
Y7A32	7538	Y7A69	17128
Y7A33	7647	Y7A70	17161
Y7A34	7812	Y7A71	17367
Y7A35	8008	Y7A72	17390
Y7A36	9062	Y7A73	17395
Y7A37	9078	Y7A74	17670
Y7A38	9086	Y7A75	19242
Y7A39	9140	Y7A76	19390
Y7A40	9784	Y7A77	19445
Y7A41	9910	Y7A78	19700
Y7A42	9920	Y7A79	19885
Y7A43	10210	Y7A80	20020
Y7A44	10430	Y7A81	20170
Y7A45	10464	Y7A82	20840
Y7A46	10554	Y7A83	22722
Y7A47	11000	Y7A84	22732
Y7A48	11448	Y7A85	22793
Y7A49	11459	Y7A86	22950
Y7A50	11541	Y7A87	22955
Y7A51	11574	Y7A88	23460
Y7A52	12130	Y7A89	24000
Y7A53	13436	Y7A90	24300
Y7A54	13538	Y7A91	24800
Y7A55	13946	Y7A92	26450
Y7A56	14410	Y7A93	26800
Y7A57	14460	Y7A94	27400
Y7A58	1456		

Embassy Frequencies:
5793.5 6787 6828 6982 9065 9145
11441 11676 14880 16355 17362 17375
19385 19393 19395 19241 19495 19500
20004 20023 20506 20728 21842 22729
23342 24005

Call	Location
AND20	Madrid, Spain
H6A21	Managua, Nicaragua
Y7B23	Moscow, USSR
Y7B25	Bucharest, Hungary

Y7B26	Sofia, Bulgaria
Y7B27	Tirana, Albania
Y7B32	Belgrade, Yugoslavia
Y7B33	Helsinki, Finland
Y7B45	Nicosia, Cyprus
Y7B72	Paris, France
Y7B73	Rome, Italy
Y7B84	Ankara, Turkey
Y7C24	Prague, Czechoslovakia
Y7C31	Warsaw, Poland
Y7C65	Vienna, Austria
Y7C66	Berne, Switzerland
Y7C69	Stockholm, Sweden
Y7C71	London, England
Y7C81	Copenhagen, Denmark
Y7D35	Conakry, Guinea
Y7D39	New Delhi, India
Y7D42	Luanda, Angola
Y7D49	Dar es Salaam, Tanzania
Y7F44	Damascus, Syria
Y7F47	Baghdad, Iraq
Y7F54	Algiers, Algeria
Y7F59	Tripoli, Lybia
Y7F68	Beirut, Lebanon
Y7G22	Beijing, PRC
Y7G29(45?)	Pyongyang
Y7G34	Hanoi, Vietnam
Y7G41	Ulan Bator (Tokyo relay)
Y7G59	New Delhi, India
Y7L36	Havana, Cuba
KNY37	Washington, DC 8135 11166 19210
ONN30	Brussels, Belgium
CUV523	Lisbon, Portugal

West Germany

Mode:CW/RTTY

Freq	Call	Location
16432	DMK	Bonn
20417 20422	DFY	Tel Aviv, Israel
5220 7983 13894	DMK260	Warsaw, Poland

Ghana

Mode:RTTY (50 baud)

Location	Frequencies	
Accra	18890	20948
Prague, Czechoslovakia	18890	20948
London, England	18890	20948
Washington, USA (KNY22)	17580	

Great Britain

Mode: RTTY

Location	Frequencies	
Washington, USA (KNY 29/30)	11106	18808
	18964	

Hungary

Mode: CW/RTTY (50 baud)
Budapest:

2450 4500 5450 5470 5475 5725
6762 6765 6795 6799 6800 6802
7937 8174 9046 9055 9125 10318
10325 10393 10400 11460 11462 11464
12257 12605 13374 13385 13396 14377
14490 14809 14814 14820 14829 15487
15720 15728 15988 16398 16400 16430
16457 17503 18045 18051 18060 18065
18068 18392 18402 18585 19230 19514
20001 20011 20073 20398 20802 21755
23363 23370 23385

Embassy Frequencies:

5475 7442 8160 9051 9301 10398
10853 12254 12260 12265 16432 16443
16452 16460 18435 18500 19512 20014
22809 23360

Call	Location
HGX20	Hanoi, Vietnam
HGX21	Budapest
HGX22	Athens, Greece
HGX23	Rome, Italy
HGX27	Berne, Switzerland
HGX28	Vientiane, Laos
HGX29	Paris, France
HGX31	Warsaw, Poland
HGX38	London, England
HGX39	New Delhi, India
HGX41	Damascus, Syria
HGX42	Tehran, Iran
HGX44	Baghdad, Iraq
HGX45	Islamabad, Pakistan
HGX49	Beirut, Lebanon
HGX53	Accra, Ghana
HGX54	Conakry, Guinea
HGX55	Algiers, Algeria
HGX56	Cairo, Egypt
HGX57	Rabat, Morocco
HGX60	Khartoum, Sudan
ONN39	Brussels, Belgium 8160 9046 12257
CME339- 341/377	Havana, Cuba 14815 16458 17460 12260
8EH39	Jakarta, Indonesia 14809 19800-19805

KNY26 Washington, USA
9040 10642.5 11090 15728
16065 16392 17573 20011

India

Mode: CW/RTTY (50 baud)
Frequencies:
10024 10145 11987 13486 13496 13523
15482 16372 16397 16418 18320 19007
19016 19022 19050 19055 19435 19440
20525 20610 20888

Location	Callsign
New Delhi	8WD4 8WD6 8WD7
Belgrade, Yugoslavia	8WB1
Moscow, USSR	8WW3
Port Louis, Mauritia	8WB3
Tehran, Iran	8WB4
Bangkok, Thailand	
Hanoi, Vietnam	
Rangoon, Burma	
Dhaka, Bangladesh	

Indonesia

Mode: SSB/RTTY (50/57 baud)
Frequencies:
10900 12168 15918 16399 17480 17850
18050 18317 18321 18403 18448 18488
18498 18505 18689 18701 18707 18808
19006 19020 19094 19101 19133 20398
20405 20908 20938 20977 20988 20996

Locations

Algiers, Algeria	Lagos, Nigeria
Cairo, Egypt	Mexico City, Mexico
Hanoi, Vietnam	New Delhi, India
The Hague, Netherlands	Paramaribo, Surinam
Jeddah, Saudi Arabia	Prague, Czechoslovakia
Tehran, Iran	Tunis, Tunisia

Iran

Location	Callsign	Frequencies
Brussels, Belgium	ONN34	12238.5 16108.5

Ireland

Location	Callsign	Frequency
Brussels, Belgium	ONN37	8105.5

Israel

Mode:ARQ
Frequencies: 13690 24300 Jerusalem

Italy

Mode:ARQ
Frequencies:
4050 6771 7960 8115 9445 10230 10415
10482 10547 11086 11181 11441 11449
11461 11422 12311 13759 13781 13914
13926 13936 14513 14522 14657 14695
14710 14734 14738 14821 14841 15781
15806 15811 15831 16100 16301 16331
18052 18337 18402 18421 19321 19514
19518 19816 20161 20321 20327 20712
20722 22711 23272

Location	Callsign	Frequency
Addis Ababa, Ethiopia	9EU76	21755
Algiers, Algeria		13761
Baghdad, Iraq		20327
Beirut, Lebanon		15831 18052
Belgrade	IPG27	
Islamabad		15784
Jeddah, Saudi Arabia		18402
Mogadishu, Somalia		19816
Nicosia, Cyprus		18421
Rabat, Morocco		
Tripoli	IPG71	
Tunis, Tunisia		
Warsaw, Poland	IPG22	

Korea

Mode:RTTY (50 baud)
Frequencies:
13347 14696 15768 19231 19635 20420

Kuwait

Location	Callsigns
Amman, Jordan	9KE317
Baghdad, Iraq	9KE205 9KE217 9KE238 9KE246 9KE261 9KE275
Beirut, Lebanon	9KE222 9KE251 9KE280 9KE296 9KE302 9KE326
Cairo, Egypt	9KE247 9KE263 9KE293 9KE316 9KE341 9KE361

Damascus, Syria	9KE221 9KE249 9KE279 9KE292 9KE304 9KE325
Jeddah, Saudi Arabia	9KE295 (11416 kHz)
Khartoum, Sudan	9KE305 9KE338 9KE387 (20722 kHz)
New Delhi, India	9KE278
Tehran, Iran	9KE245

Libya

Location	Callsign	Frequencies
Aden, Yemen	70B452	11125 11985
Brussels, Belgium	ONN42	11508 20682 20732 20932
Havana, Cuba	CME406	11508
Prague, Czechoslvka	OMZ30	4500 11508 14387 18297 20682

Mongolia

Mode: RTTY (50 baud)

Location	Call	Frequencies
Ulan Bator JTF23		17538 17542 17554-17585 18667
Prague, Czechoslovakia	OMZ24	17541 18668 18933

Morocco

Mode: CW and 50 bauds standard RTTY
Frequencies: 11433 20378
Stations:
Cairo L6E
Unidentified: E7U F9O H9N O4T S4K

Netherlands

Mode: SSB/ARQ
Frequencies:
7700 7714 7800 13412 13610 13620 13770 15645 15727 15966 15987 18462 18499 18643 18707 18715 18743 19012 19124 19303 19730 21843 23549 23560 23570

Call	Location
PCW1	The Hague
PCW2	Tel Aviv, Israel
PCW3	Beijing, China
PCW4	Jakarta, Indonesia
PCW5	Cairo, Egypt
PCW6	Jeddah, Saudi Arabia
PCW7	Damascus, Syria
PCW8	Tripoli, Libya
PCW9	Lagos, Nigeria
PCW10	Islamabad, Pakistan
PCW11	Bangkok, Thailand
PCW12	Kinshasa, Zaire
PCW13	Tehran, Iran
PCW16	Accra, Ghana
PCW20	Warsaw, Poland
Z2H6	Harare, Zimbabwe
-	Ankara, Turkey
-	Baghdad, Iraq
-	Beirut, Lebanon
-	Khartoum, Sudan
-	Moscow, USSR
-	Paramaribo, Surinam
-	Yaounde, Cameroon

Niger Republic

Mode:SSB

Location	Frequency
Niamey	15941.5
Algiers, Algeria	15941.5

Nigeria

Mode: SSB/RTTY (TOR-ARQ)

Location	Call	Frequency
Lagos		23104
Addis Ababa, Ethiopia	ETS43,ETW21	19463 23104
Warsaw, Poland	SRZ911	21846 23104
Washington, USA	KNY36	8135 11166 19210

Norway

Mode: SSB/ARQ
Frequencies: 13386 16251 18401 20129 21763 21953

Call	Location
LJA20	Oslo
LJA21	Tel Aviv, Israel
LJA22	Nairobi, Kenya
	Ankara, Turkey
	Dar es Salaam, Tanzania

Pakistan

Mode: SSB/RTTY (50 baud)
Frequencies:
13252 14365 14370 14377 14407 16202 16351 18973 19015 19022 19747 19905

20010 20028 20099 20369 20373 20381 21856 21876 21882

Location	Callsign
Islamabad	ASP32
Karachi	ASK21
Abu Dhabi, United Arab Emirates	
Algiers, Algeria	
Amman	
Ankara, Turkey	ASS6
Baghdad, Iraq	
Beijing, China	
Beirut, Lebanon	
Belgrade, Yugoslavia	
Bonn, Fed.Rep.of Germany	
Cairo, Egypt	
Damascus, Syria	
Dhaka, Bangladesh	ASP23
Doh'a	
Dubai, United Arab Emirates	
Geneva, Switzerland	
Jeddah, Saudi Arabia	
Kathmandu, Nepal	
Kuala, Lumpur	
Kuwait	
London, England	
Mogadishu, Somalia	
Moscow, USSR	ASM41
Muscat	
New Delhi, India	
Paris, France	
Pyongyang (Berlin relay)	9047.5
Riyadh	
Rome, Italy	ASZ57
San'a	
Stockholm, Sweden	ASN69
Tehran, Iran	
Tripoli, Libya	

Philippines

Location	Frequencies
Tel Aviv, Israel	14678.5 14694 17365

Poland

Mode: CW/RTTY (50 and 75 baud)
Warsaw:
5431 6780 6991 7737 8154 9079 9112 9162 9881 10423 10538 11145 11464 12078 12124 13699 13722 13872 14448 14772 15701 16127 16240 16269 16350 16366 17430 18063 18572 19428 19617 19809 20319 20322 20473 20740 20939 20970 21847 23952

Location	Callsign	Frequencies
Accra, Ghana	SPP51	17336 23157
Addis Ababa, Ethiopia	ETK47/	11478 20375 20624
	ETT37	
Algiers, Algeria	SPP312	
Baghdad, Iraq		18572
Bangkok, Thailand	SPP317	
Beijing, PRC		10484
Beirut, Lebanon		10832 11037
Berlin, German Dem.Rep.		5300
Berne, Switzerland		12131
Brussels, Belgium	SPP322	10900
Damascus, Syria		11123 14832
Havana, Cuba	CME301-	9481 10484 24500
	304	
Islamabad, Pakistan	SQL47-49	19668 19707 20245
Jakarta, Indonesia		18662 20568
Jeddah, Saudi Arabia	SQR61	16358
Kinshasa		24330
Lagos, Nigeria	SPP341	12300 19676 20915
Luanda, Angola	SPP342	19973 20797
Maputo, Mozambique		20205
Montreal, Canada		14681
Moscow, USSR		11447
New Delhi, India	SPP5/	20473 24573 18114
	SQL45	
Nairobi, Kenya		24612
Ottawa, Canada	CYS22	15582 18092 23376
(Paired freqs to		5194/5398
		7791/8097
Warsaw shown)		11688/10942
		12060/18092
		14684/14448
		15990/18187
		16024/16413
		17532/18060
		18355/18842
		20030/21817
Paris, France		13710 14731
Phnom Penh	SPP351	
Stockholm, Sweden		8123 10183
Tehran, Iran		15595 19704
Vienna, Austria	SRT52	6936 7933
Washington, USA	KNY20	15804 19458

Roumania

Mode: RTTY/CW

Location	Callsign	Frequencies
Abidjan, Ivory Coast	TUR19	11590 15500 18150
Brussels, Belgium	ONN33	13550 16250
Havana, Cuba	CMR342-348	9966 10550 11980 15960
Washington, USA	KNY25	9040 11090 16065 16392 19950

Saudi Arabia

Ottawa, Canada:
Callsign: VCR976
Frequencies: 5806 14745 15595 17448 17624 23100

Senegal

Mode: SSB
Frequencies: 18120 13295

Spain

Mode:SSB & RTTY

Freq	Location
14537 14542	Madrid
17435	Yaounde, Cameroon & Nouakchott, Mauretania
18205 18210	Malabo, Equatorial Guinea
19295	Madrid

Sweden

Mode: SSB/RTTY (75 and 100 baud)
Frequencies:
6980 7605 7972 10150 10164 10958
12101 12225 12304 12310 14962 14972
17428 18758 18803 18810 20010 20942
20954 20964 20986 23210 23505 23512
23526 23532 23584 26660 25035

Call	Location
SAM20	Athens, Greece
SAM21	Berlin, German D.R.
SAM23	Helsinki, Finland
SAM24	Copenhagen, Denmark
SAM25	Lisbon, Portugal
SAM26	London, England
SAM30	Madrid, Spain (also AND5)
SAM34	Harare, Zimbabwe
SAM35	Belgrade, Yugoslavia
SAM36	Budapest, Hungary
SAM37	Bucharest, Roumania
SAM38	Moscow, USSR
SAM39	Prague, Czechoslovakia
SAM40	Warsaw,Poland
SAM41	Berlin, FRG
SAM45	Ankara, Turkey
SAM46	Baghdad, Iraq
SAM47	Beirut, Lebanon
SAM48	Damascus, Syria
SAM49	Jeddah, Saudi Arabia
SAM50	Cairo, Egypt
SAM51	Tehran, Iran
SAM52	Tel Aviv, Israel
SAM53	Amman, Jordan
SAM54	Vientiane, Laos
SAM55	Bangkok,Thailand
SAM57	Dhaka, Bangladesh
SAM58	Jakarta, Indonesia
SAM59	Hanoi, Vietnam
SAM60	Islamabad, Pakistan
SAM61	New Delhi, India
SAM62	Beijing, China
SAM64	Pyongyang, N.Korea
SAM65	Seoul, S.Korea
SAM66	Neutral Nations Supervisory Commission, S. Korea
SAM67	Colombo, Sri Lanka
SAM70	Addis Ababa, Ethiopia
SAM71	Dar es Salaam, Tanzania
SAM72	Kinshasa, Zaire
SAM73	Lagos, Nigeria
SAM74	Monrovia, Liberia
SAM75	Nairobi, Kenya
SAM76	Pretoria, South Africa
SAM77	Tripoli, Libya
SAM78	Tunis, Tunisia
SAM79	Lusaka, Zambia
SAM80	Gaborone, Botswana
SAM81	Bissau, Guinea Bissau
SAM82	Maputo, Mozambique
SAM83	Santiago, Chile
SAM84	United Nations, NY, USA
SAM86	Mexico City, Mexico
SAM88	Buenos Aires, Argentina
SAM89	Havana, Cuba
KNY34	Washington, USA 11106 14355 18808 The Hague, Netherlands

FEDERAL GOVERNMENT

Switzerland

Mode: RTTY
Frequencies:
5768 7650 7657 7675 9166 10960 10962 10969 13580 13695 13982 16109 18248 18270 18285 22963 13605 18425 22977

Call	Location
HBN25	Berne
HBD20	Berne
HBD21	Rome, Italy
HBD22	New Delhi, India
HBD49	Budapest, Hungary
HBD57	Bonn, GDR
HBD63	London, England
HBM41	Punmunjon, Korea
HBD41	Pretoria, South Africa
HBD56	Warsaw, Poland
ONN38	Brussels, Belgium
KNY27	Washington, USA 10642 13605 18250 22960 Paris, France Budapest, Hungary

Thailand

Mode: SSB/RTTY
Frequencies:
13300 13745 13865 13918 16352 18812 20103 20109 20735 20908 21876 21948

Location	Callsign
Bangkok	HSF212BKK
Bonn, Fed.Rep.of Germany	HSF212BNN
New Delhi, India	HSF212NDH
Washington, USA 12205 15542 19015 21773	HSF212WSN

Tunisia

Mode: RTTY (50 baud)
Tunis 6CV / 0MP
Frequencies:
2755 2855 5556 5566 5621 7676 7776 7979 8866 8888 8898 16285

Turkey

Mode: CW/RTTY
Frequencies:
11123 13931 13942 13815 14600-14800 16455 18965 19965 19703-19705 20235

Call	Location
SFA/SFB2/ SFC	Ankara
YMK	Beirut, Lebanon
YMK1	Damascus, Syria
YMK2	Nicosia, Cyprus
YMK4	Athens, Greece
YMK5	Sofia, Bulgaria
YMK6	Tel Aviv, Israel
YMK7	Cairo, Egypt
YMK8	Bucharest, Roumania
YMK9	Amman, Jordan
YML1	Rome, Italy
YML2	Belgrade, Yugoslavia
YML3	Baghdad, Iraq
YML4	Vienna, Austria
YML5	Prague, Czechoslovakia
YML6	Brussels, Belgium
YML7	Moscow, USSR
YML8	Alger, Algeria
YML12	Paris, France
YML13	Kabul, Afghanistan
YME	Stockholm, Sweden
YMO	Kuwait
YMN	New Delhi, India
YMS	Warsaw, Poland
YMN2	London, England
YMN4	Copenhagen, Denmark
YMN5	Karachi, Pakistan
YMN6	Ministry of Foreign Affairs, Ankara
YMN8	Tehran, Iran
YMN9	Tirana, Albania
YMN12	Madrid, Spain
ONN32	Brussels, Belgium (15657)

U.S.S.R.

Mode:CW/RTTY

Location	Call	Frequencies
Madrid, Spain	AND8	13965
Luanda, Angola	D3M74	20688
Washington,USA	KNY31	5856 12065 14915 16242 10925 20525
Dublin, Ireland	RLX	4893 4903 5181 5744 6842 9217 9842 11148 12211 14426 17528
Warsaw, Poland	RXO	4530 5410 6972 11152 12030

Vietnam

Location	Call	Frequency
Addis Ababa, Ethiopia	ETM85	13850
Aden, Yemen	70B455	11650

Yemen

Location	Callsign	Frequencies
Addis Ababa, Ethiopia	ETM99	13997

Yugoslavia

Mode: RTTY (50, 75 and 100 baud)

Location	Callsign	Frequencies
Belgrade ("RGB")		6824 14913
Addis Ababa, Ethiopia ("MGE")	ET183,ETT95	9840 20950
Athens, Greece		9973
Brasilia, Brazil		20413
Dar es Salaam ("RDS")		21008
Helsinki, Finland		11411 14662
Kinshara ("UCU")		
Lusaka ("ZGA")		21003 21010
Nairobi, Kenya ("WUZ")		20957
Nicosia, Cyprus		13378
Ottawa, Canada	VCS838	7445 8172 10780 12295 14515 15705 16459 18247
Paris, France		14912
Prague, Czechoslovakia		9982
Tehran, Iran		18968
Warsaw, Poland	SRZ922	7678 8120 9985 10110
Washington, USA	KNY21	7719 11305 13375 14649 14875 15704 18430 19225 20001 20149
Other diplomatic freqs		11145 18042 18972 10434

Zaire

Location	Callsign	Frequencies
Brussels, Belgium	ONN25	20348

Spy Number Stations

Many countries of the world utilize the shortwave spectrum to send encoded transmissions to foreign agents in adversarial countries. These are most often encountered by listeners as four- or five-digit numbers in female voice with computerized cadence since the recorded voice is accessed digit-by-digit via a keyboard. The voice is known among the agents as "Cynthia from Langley".

The format is usually a callup ("Attention") followed by a three-digit address (agent identifier), then a group count (number of digit groups to follow), the numbers text, and finally the "end of message" or "finale" announcement. A repeated 5-4-5 means that there will be no message.

Frequencies are often paired to allow selection of the best reception by the recipient. The same message may be repeated on other frequencies immediately following the first transmission. Identical numbers messages have been heard months later, suggesting phantom traffic for practice, diversionary disinformation or even a repeat of a routine instruction.

Transmissions usually begin on quarter hours, with on-the-hour the most common. The mode is normally reduced-carrier upper sideband. Morse code numbers transmissions are also heard; five-digit groups on the hour and four-digits groups on the half hour. They equate as: A=1, N=2, D=3, U=4, W=5, R=6, I=7, G=8, M=9 and T=0.

Four-digit cut-number transmissions are also heard and equate as: A=1, U=2, V=3, 4=4, E=5, 6=6, B=7, D=8, N=9 and T=0.

Four-digit Spanish language and 3/2 digit English language broadcasts originate from Remington, Virginia (National Communications System transmitter site which also houses the KKN50 State Department tranmitter), and Jupiter Inlet, Florida (NASA relay site).

Frequencies used for these broadcasts include 4307, 4670, 5090, 5238, 5812, 6802, 6840, 7725, 7836, 8070, 8418, 9074, 9222, 9958, 10324, 10570, 10665, 11491, 11532, 11605, 11624, 12156, 13452, 13808, 14421, 14750, 15651, 15810, 16310, 16450, 17693, 18621, and 18737 kHz.

Five-digit Spanish and English language broadcasts originate from Havana, Cuba; German language transmissions from Nauen, East Germany; and Czech language transmission most likely from Vratislawice, Czechoslovakia.

FEDERAL GOVERNMENT

Quite probably the most overt of these broadcasts are made by the West German PTT (Deutches Bundespost) at Frankfurt. Prefaced by a voice ID ("Hier ist DFC37" or "Hier ist DFD21") on 3370 or 4010 kHz and followed by a sequence of 20 musical tones, the numbers transmission begins.

Variants on the "spy numbers" protocol are the phonetic broadcasts ("kilo papa alpha two"), possibly the Israeli Mossad intelligence organization, and the seemingly-random tone sequence of the "piccolo" transmissions.

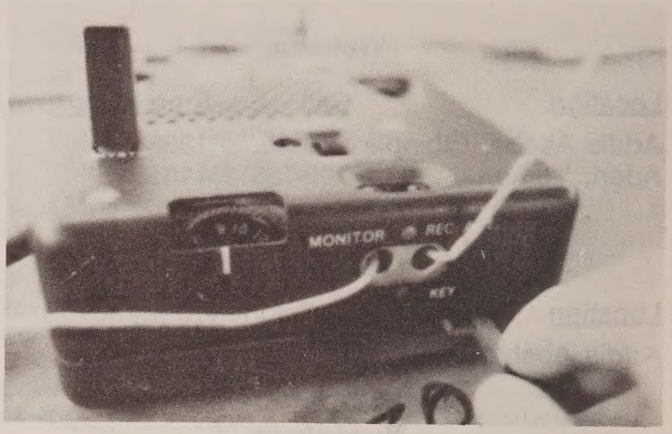
The cryptic broadcasts, enciphered with an unbreakable one-time pad and probably containing routine itinerary information, are sent to insurgent field agents possessing inconspicuous portable shortwave receivers. The numbers in the transmission are subtracted from the numbers in the pad, yielding numerals 1-26, corresponding to the alphabet.

A list of recently-monitored numbers transmission schedules follows. Since these schedules are subject to frequent changes, no claim for present accuracy is made. We would appreciate corrections from our readers.

Abbreviations and Symbols

CW	Morse Code
CZ	Czechoslovakian
EE	English
FF	French
GG	German
PH	Phonetic characters ("kilo papa alpha two")
RR	Russian
SS	Spanish
U	Upper sideband, reduced carrier
4,5	Number of characters in a group
//	Two or more simultaneous transmissions
*	Transmits second half of hour (typically 30 or 45 minutes after the hour)

Underlined entries originate from Remington, VA



Miniature "spy" radio

Time/Freq	Language/ Group	Paired Freq/ Day Heard
0000		
2707	GG/5	//5015,7404 SUN
3090	SS/5/CW	
4584	CZ?	M
4670	VLB2	//7605,12950
5015	GG/5/PH	//2707,7404 SUN M T
5090	CW/5	//6840 W
5812	SS/4	M
6203	GG/5	
6227	SS/5	SAT
*6276	SS/5	
6802	SS/4	SAT
6959	EE	M
7404	GG/5	//5015 SUN T
7445	EE/5	
8640	MIW2	
9038	SS	
9049	SS	
9074	SS/4	//11532 T W TH F
9972	GG/5	
11532	SS/4	//9074
*13436	SS	
0100		
*2953	SYN2	//5643
3090	SS/5	M SAT
3445	SS/5	
*3646	SS	//7397
*4027	SS/5	
4052	GG	T
*4320	SS/5	M
4670	XLE2	//7605, 12950
5015	GG	//7404
*5643	SYN2	//8425, 2953
5812	SS/4	//8418
6102		SAT
*6745		

6773	SS/5	TH
6802	SS/4	//9074, 11532 SAT SUN T
*6861	CW/5	
6890	SS/4	M F
7000	GG/5	TH
7397	SS	//3646
7445	KPA2	
7532	GG/5	
7605	XLE2	//4670, 12950
*8125	EE/5	
*8173 U	EE/5	
8418	SS/4	//5812
*8425	SYN2	//2953, 5643
8640	MIW2	
8925	EE/5	
9074	SS/4	//6802, 11532 SAT SUN TH
9100	GG/5	M
9222	SS/4	//11532 F
9225	SS/4	
*9243	SS/5	
9265	GG/5	
9450	GG/5	
10177 U	GG/5	
10570	SS/3	//13808
11532	SS/4	//6802,9074 SAT SUN T TH
11545	GG/5	SUN
*11563	SS/5	
12316	SS	
12950	XLE2	//7605, 4670
13808	SS/3	//10570
14622	GG/5	
*16450	SS	

0200

3090	SS/5	
3445	SS/5	
* 3445	SS/5	
4030	SS/5	
* 4037	SS/5	
4044	SS/5	
4050	GG/5	SAT
4100	SS/5	T
4210	SS/5	
4300	SS/5	W F
4640	SS/4	F SUN
4670	SS/4	//5812 M SAT
4781	CW/5	SAT TH
*5010 U	SS(LIVE)	
5015	SS	
5642 U	SYN2	
5812	SS/4	//8418 F
*5870	CW/5	
5916	CW/5	SAT TH
*6790 U	CIO2	
6802	SS/4	//9074 T TH
6840	SS/4	//9958 DAILY
6865	CW/5	SAT
6870	SS/4	W
6963	EE/S	SAT
6980	SS/4	M
6990	SS/4	W
7376	CW/5	
7445	KPA2	
*7595	SS/5	W
*7785	SS/5	
7828	SS/5	
7887	SS/5	
*8163	CW/5	
8175	GG/5	
8872	CW/5	SAT
*8925	EE	
9050	GG/5	
9052	EE	M
9074	SS/4	//6802 T
9267	GG/5	
9267	CW/5	
*9325 U	GG/5	
9430	GG/5	W
9435	EE/5	SUN
9450	GG/5/PH	SUN
9972	EE/5	
10247	EE/S	SAT
10382	SS/5	SUN
10990	SS/5	SAT
*11580	SS/5	
11610	SS/5	SAT
13485	SS/5	
11950	SS/4	SAT
13010	SS/4	SAT

0300

*3227	RR/5	OR
	CZ/5	
3260	GG/5	
3445	SS/5	
*3767	PH/5	
3767	RR/5	OF
	CZ/5	
4025	SS/5	
4030	SS/5	
4200	SS/5	W
4300	SS/5	TH
*4307	SS/4	//4670 M TH
*4442	SS/5	
4560	YHF	
4610	RR/5	
4670	SS/4	//4307,5812 M TH
4760	EE/5	F
4780	CW/5	
5182	SS/5	M
*5812	SS/5	
5812	SS/4	
6784	EE/5	F
6790 U	CIO2	
*6812	SS/5	

FEDERAL GOVERNMENT

*6833	SS/5	
6835	SS/5	
*6840	SS/5	
*6840	CW/4	//11605 DAILY
6963	EE/5	
7025	SS/5	
7430	SS/5	M
7445	KPA2	
7500	SS/5	SAT
7525	SS/5	
8173 U	GG/5	
8332	SS/5	TH
8430	SS/5	
9050	GG/5	W
9052	RR/5	
9074	SS/4	//11532 T W SAT SUN
9075	GG/5	M T
9265	GG/5	
9265	EE/5	
9380	SS/5	
9445	SS/5	
*10110	SS/5	
10135	SS/5	SAT
*10420	SS/5	W
11520	SS/5	
11532	SS/4	
*11560	SS/5	//9074 SUN
12163	CW/4	
14441	CW	

0400

3090	SS/5	
3226	RR/5 OR CZ/5	
* 3445	SS/5	
4027	SS/5	F
4051	SS/5	
4730	CW/5	
4780	KPA2	
4780	CW/5	
4828	SS/5	
5812	SS/4	//6802 T SUN
6226	SS/5	SUN
6235	GG/5	SAT
*6250	SS/5	M W
*6270	GNZ2	
6452	SS/5	M W
6500	EE	
6572	SS	
6772	SS/5	
*6784	SS/5	SUN
6802	SS/4	// 9222 T F SUN
*6880	SS/5	
*6892	SS/5	SUN
*7115	EE	
7382	SS/5	
7410	RR/5	
7410	FF/5	
* 7431	SS/5	
7445	KPA2	
7527	SS/5	
7836	SS	
*8063	GG	
8173 U	GG/5	
*8215	SS/5	F
8418	SS/4	//11532 SUN
*8425	EE	
9074	SS/4	//11532 TH
9222	SS/4	//11532 W
9240	SS/5	
9325	GG/5	M
9435 U	EE	//12242, 11034
10177 U	GG/5	T
*10182	SS/5	F
11054	SS	

0500

3090	SS/5	
3190	SS/5	
3230 U	GG/5	
3445	SS/5	
4055	SS/5	
4448	PH/5	
4825	SS/5	
5315	GG/5	
5812	SS/4	//6802 F
5910	GG/5	
6626	SS/5	T
6627	CW/5	
*6270	PH/5	
*6578	SS/5	W
*6665	SS/5	
*6670	SS/5	
*6782	SS/5	
6802	SS/4	//8418 W SAT
6825	GG/5	
6822	SS/5	
*6825	SS/5	SAT
6833	SS/5	TH
6892	SS/5	SUN
6995	SS/5	SUN
7375	EE/4	SAT
*7428	SS/5	F
7627	SS/5	
*7584	SS/5	TH
7887	SS/5	
7918	YHF2	
7918 U	PH/5	
8046	SS/5	
*8056	SS/5	SUN
8100	SS/5	
8110	EE	
8112	SS/5	
*8124	SS/5	W
8418	SS/4	//11532 M
8873	SS/5	M

8873	CW/5	M
*8914	SS/5	
*9383	EE/5	
9452	SS/5	
9465 U	EE/4	W
10135	SS/5	SAT
10344	SS/5	T
*10740	GG/5	
*11437	SS/5	W
11519	SS/5	
11532	SS/5	
*11617	PH/5	M F
11685	EE/4	W
12324	SS/5	
13923 U	CIO	

0600

*2706 U	GG/5	//5015 U,11110 U
*3225	RR/5 OR CZ/5	
3240	SS/5	
3445	SS/5	
4027	SS/5	
4670	SS/4	//6802 M W
4835	SS/5	TH
*4881	CZ/5	
*5015 U	GG/5	//2709 U,11110 U
5692	GG/5	SAT
5746	GG/5	
5812	SS/4	//6802 F
6625	SS/5	T
*6294	SS/5	
*6554	SS/5	F W
*6220	CW/5	
6733	SS/5	
6772	SS/5	
*6803	SS/5	
*6872	SS/5	T TH
*6892	SS/5	SUN
*6954	SS/5	W
7375	GG/5	
7404	GG/5	//5015 SUN
*7404 U	GG/5	//5015 U
*7845	SS/5	
*7887	SS/5	
*7908	SS/5	SAT
7918	YHF2	
8057	SS/5	SUN
8117	SS/5	
8417	SS/4	//11532
*10020	SS/5	SUN
*11110 U	GG/5	//5015 U, 2705 U
*11416	SS/5	W
11532	SS/4	//8417
11634	SS/5	

0700

* 4050	SS/5	M
4786	SS/5	
4835	SS/5	
5094	PH/5	
5247	CZ/5	
5332	SS/5	
5448	RR/5	
5812	SS/4	//6802 T
*5927	SS/5	
*5934	SS/5	SAT
6226	SS/5	W
6768	SS/5	
6802	SS/4	//5812
*6867	SS/5	
6876	SS/5	
6892	SS/5	SUN
*7531	SS/5	
7846	SS/5	
7887	SS/5	
8544	SS/5	
9267	SS/5	
9325	SS/5	
*9462	SS/5	SAT
*10020	SS/5	
11634	SS/5	
12726	SS	
12905	GG/5	
14603	EE/5	
*14603	GG/5	

0800

5410	GG/5	
*5938	SS/5	
5946	RR/5	
6454	GG/5	SAT
6767	GG/5	
6842	GG/5	SAT SUN
6853	GG/5	SAT SUN
6860	GG/5	SAT SUN
6990	SS/5	
7405	GG/5	SAT SUN
7436	SS/5	
7440	SS/5	
7663	GG/5	
7846	CW,SS	
7906	SS/5	SUN
8195	GG/5	SAT
9455	GG/5	
9455	GG/5	
9462	SS/5	SAT
9560	SS/5	
10020	SS/5	SAT W
10742 U	GG/5	SAT
11635	SS/5	SAT
12314	SS/5	
12905	GG/5	

FEDERAL GOVERNMENT

14603 EE/4 SAT SUN
17170 MIW2 SAT

0900

*5135 CW/5
5410 GG/5 SAT
5985 SS
6410 GG/5 SAT
6454 GG/5 //12905
6920 GG/5
7250 GG/5
7375 GG/5 //7410 SAT SUN
7860 U GG/5
11275 GG/5 SAT
11633 SS
12905 GG/5 //6455
17170 MIW2
17410 UEZI2

1000

4730 U GG/5 //5910 SAT
5238 SS/4 //5812, 6802 M TH
5410 GG/5 SAT
*5810 SS/5 W
*5820 GG/5
5910 GG/5 //4730 U SAT
5985 SS
*6000 SS/5 W
6223 CW/5
6453 GG/5
6860 GG/5 //7405
6920 GG/5
7375 GG/5 //7405
7405 GG/5 //6860, 7375
*7725 SS/4 //10324 DAILY
8418 SS/4 //11532
11272 GG/5 SAT
12905 GG/5

1100

5238 SS/4 //6802 M TH
5450 CZ/5
*5810 SS/5 W
*5820 GG/5
6825 GG/5 //8120 SAT
7405 GG/5
7420 SS/5 M TH
*7430 SS/5 M
*7527 SS SAT
8120 GG/5 //6825 SAT
9074 SS/4 //10665, 13452 T W F
*11605 CW/4 //118737 DAILY
17170 MIW2

1200

*4320 SS/5 TH
*5015 U GG/5
*5410 GG/5
5810 CW/5 W
5820 GG/5
5826 SS T
6890 SS/5 F
7207 GG
7405 U GG/5 //5015
8150 SS/5 M
8160 SS/5 TH
*8175 SS/5 F
*9074 SS/5 TH
*9100 SS/5 T
9150 SS/5 SAT
*9200 SS/5 T
*11110 U GG/5 //7505, 5015
17170 MIW2

1300

5410 GG/5
8005 SS W
8045 SS W
8063 U GG/5
8418 SS/4 //11532 SAT
9074 SS
*9112 SS/5 SAT
10570 SS/4 //13808 W
12747 MIW2 //17170
12950 EE
17170 MIW2 //12747

1400

5090 EE/5 //6840 W TH
6817 CZ/3(or SERBO CROATIAN)
8062 GG/5
8418 SS/4 //10665 SAT
9074 SS/4 //11532 T F
9831 CW
11532 SS/4 //9074 F
12800 EE/5
13485 SS/5
14727 GG/5 //14946 U SUN
14750 SS/4 //15810 T
*14945 U GG/5 //15610 SUN
15450 SS/5
15610 GG/5 //14945 U SAT SUN
17170 MIW2

1500

*3767 CZ/5 //4030-DAILY
*4030 CZ/5 //3767-DAILY
*4780 U SERBO-CROATION/5
*4820 U GG/5
*4881 CZ/5 DAILY

4888 GG/5
6235 U GG/5 //9377-SAT
*7405 GG/5
*7740 GG/5
9377 GG/5 //6235 U
12950 EE/5
13782 U GG/5
13854 SS/5
14425 SS/4 //17436
14856 SS/5
*14946 GG/5
16620 CW/3
17436 SS/4 //14425
18456 SS/5

1600

3370 U GG/5
4010 U GG/5
*4593 GG/5
4730 GG/5
*5085 U PH/5
5285 GG/5
*5643 SYN2 //8425
*5731 GG/5
7662 GG/5
8418 SS/4 //10665 SUN
*8425 SYN2 //5643
10666 SS/4 //8418
11491 SS/4 SAT
11532 SS/4 //16450 W TH
16450 SS/5
16450 CW/5
17650 GG SAT

1700

3370 GG/5
3415 PH/5
3415 ART & ART 2
4010 GG5
4395 GG5
4669 VLB2 //7605, 12950
7445 KPA2
7605 VLB2 //4669, 12950
7632 EE/5
9435 EE/5
*9958 CW/5 //18737 DAILY
11532 SS/4 //16450 W TH
11795 GG/5 SUN
12050 SS/5 SAT
12950 VLB2 //4669, 7605
13010 SS/5 TH
13460 SS/5 SUN
13471 SS/5
*13921 EE
14578 SS/5
15651 SS/4 //16450 M F
16450 SS/5

1800

2707 GG/5 //5015
3220 GG/5
*3226 RR/5 OR T
CZ/5
3371 U GG/5
3400 GG5
*3767 CW/5
4010 GG/5
*4780 KPA2
5015 GG/5 //2707
*5015 U GG/5
5085 U PH5
5330 U EE/5
*5690 GG/5 SAT
5750 GG/5
10665 SS/4 //13452 M TH
11532 SS/4 //16450 F
11565 EE
12020 SS/5 SAT
12237 SS/5
*16425 SS
17320 SS

1900

3370 U GG/5
3646 SS(LIVE)//7397
3880 GG/5
4010 U GG/5
4270 MIW2
4270 U PCD9
4670 U VLB2 //7605, 12950
4775 GG/5
4790 GG/5
5085 U RCH
5090 U GG/5
5178 FF/5
5437 PH/5
6453 GG/5
6825 GG/5
7397 SS(LIVE)//13646
7605 U VLB //4670
*7858 GG
8065 U GG/5
8175 GG/5
8425 PH/5
9222 EE/5 //11532 T
9320 SS SAT
12950 VLB2 //7605, 4670 U
12236 SS/5 SAT
15810 EE/5 //17693 SAT

2000

3150 PH/5
3150 U PH/5
3220 GG/5

FEDERAL GOVERNMENT

3226 RR/5 OR CZ/5
3230 GG/5
3230 U GG/5
3260 GG/5
*3260 GG/5
3370 U GG/5
3410 GG/5
*3767 RR/5 TH
*3820 GG/5
3930 PH/5
3930 ULX,ULX2
4010 U GG/5
*4022 GG/5
*4024 U GG/5 //3232
4031 RR/5
4544 GG/5
*4669 VLB2 //7605, 12950
4670 SS/4 //6802 T SUN
*4730 CZ5
4780 KPA2
4870 GG/5
4882 RR/5
4990 GG/4,5 //5750
*5050 RR/5
*5182 GG/5
5330 U GG/5 //6875
5440 GG/5
5692 EE/4
*5734 U GG/5
6675 RR/5
6840 SS F
6855 U EE/5
6878 EE/5 F
*7445 KPA2
*7605 VLB2 //4670
8063 U EE/5
8173 U GG/5
9325 PH/5
9450 EE/4,5
9865 SAT
10665 SS/4 //11532 F
11328 RR/5
11491 SS/4 //16310
11532 SS/4 //16450 M
13682 SS/5
*14622.5 GG

2100

3151 PH/5
3151 U PH/5
*3220 GG/5
*3225 RR/5 OR CZ/5
*3230 GG/5
3260 GG/5 W
*3260 GG/5 T
3370 U GG/5
3415 PH/5
*3415 ART,ART2
*3767 RR/5
*3820 GG/5
3930 PH/5
3930 ULX,ULX2
4010 GG/5
*4012 U GG/5
4022 GG/5
4031 RR/5
*4270 PH/5
*4669 VLB2 //7605, 12950
*5015 GG/5
*5182 GG/5
5286 U GG/5
*5440 GG/5
5748 GG/5
6675 RR/5
*7434 U GG/5
*7445 KPA2
*7605 VLBS
*8078 EE/5 //9435
*8175 GG/5
*8425 SYN2
8640 U MIWS //12749 U
*9327 U CIO2
*9435 EE/5 SAT
*9450 GG/5
9965 U MIW2 M
*10125 PH/5 F
*11388 SS
11492 SS/5 SAT
11532 SS/4 //16450 T W SAT
12749 U MIW2 //8642 U
12950 VLB2 //4669, 7605
*13425 SS/5
*13728 SS/5
*13889 GG
14846 SS/5
16450 SS/4 //11532 W
18745 CW/5

2200

2953 SYN2,SYN //5643,8425
2953 PH/5
3150 U PH/5
3190 GG/5
3225 RR/5 OR CZ/5 SAT
3232 U GG/5 SAT
*3260 GG/5 SAT
3270 KPA2 //17445
3365 GG/5
3370 GG/5 //4010
3380 CZ/5
3415 PH/5
3415 ART,ART2
3767 RR/5
3820 GG/5 SAT
3920 PH/5
3920 ULX,ULX2

4010	GG/5	SAT	
*4012 U	GG/5		
*4022	GG/5		
4030	RR/5		
4052	BB/5		
4395	GG/5		
4545 U	GG/5		
4562 U	PH/5		
4669	VLB2	//7605,12950	
*4740	SS/5		
4780	KPA2	SAT	
4780 U	GG/5		
*4990	GG/5		
5015	GG/5		
*5088	RCH,RCH2		
5438	PH/5		
*5643	SYN2	//2953,8425	
5648	GG/5		
5750	GG/5		
*5812	PH-,CY1		
6355	GG		
*6825	GG/5	SUN W	
6840	EE/5	//5090 TH	
6996	RR/5		
7740	EE/5	SAT	
7445	KPA2	SAT	
*7605	VLB2	//12950,4669	
7830	EE	SAT	
*8425	SYN2	//2953,5643	
8640	MIW2		
8925	GG		
9040	GG/5		
9074	SS/4	//14421 W	
*10418	SS/5		
*11617 U	GG/5	M	
11532	SS/4	//13452 TH	
12325	SS/5		
12950	VLB2	//17605	
*13921	CIO2		
15651	SS/4	//16450 TU	

2300

3090	SS/5	SUN W	
3150	PH/5,EE	SAT	PCD,PCD2,FLU, FLU2
*3415	PH/5	SAT	
3415	ART,ART2	//5638	
3808	GG/5		
*3820	GG/5	SAT	
*3930	PH/5		
*3930	ULX,ULX2		
4030	SS/5		
4100	SS		
4320	SS/5	TH	
4595 U	GG/5		
4670	EE		
5015 U	GG/5		
5085	JSR2		
5437 U	PH/5(EE)	T	
5438	ART,ART2	//3415	
*5641	SYN2	//8425	
5692	EE/5	T	
5748 U	GG/5		
5820	SS		
5910	YHF2		
*6203	EE	T	
6790	PH/5	T	
6802	SS/4	T	
*7445	KPA2		
*7532	GG	SAT	
*7605	VLB2		
*8425	SYN2	//5641	
9074	SS4	//11532 T TH	
9450	GG		
11532	SS/4	//9074,14418	
11605	EE/5		
*12162	CW/4	SAT	
15651	SS/4	//16450 F	

Alaskan Agencies

Alaska Dept of Fish and Game
(Salmon Season Net)

3201 3230 3411 4125 5195

Bethel KJK678 WZK44
St Marys KE6628 KET156

Alaska Fish and Wildlife Net (SSB)

2512	17270
3215	22695
5925	22701.5
8753	

Alaska Bureau of Land Management
(Forest Fire Net)

3223.5 5287.5 5242.5 4863.0

Alaska Native Health Service Net
(SSB)

3277 3296 3343 3385 5150

FEDERAL GOVERNMENT

Alaska Emergency/Calling Net
(USB)

5167.5

Department of the Interior Pacific Trust Territory Net

(USB)

Call sign prefixes KUP, KUS, KWQ
Island groups: Carolines (Micronesia), Marshalls, Marianas

2724	5470	8115
3385	7875	15626
3990	7878	16412.5
5150	7935	16591.6
5205	8025	

Immigration and Naturalization Service

(Border Patrol)

The once-expansive HF CW/SSB) Border Patrol network has been replaced by a VHF/UHF repeater system. At this writing 9435 (LSB) is occasionally used between new Orleans headquarters and the Miami, Oklahoma entrance to the Will Rogers Turnpike.

Ch	Freq
1	4617.0
2	5912.5
3	9435.0
4	14585.0
5	14577.5

International Boundary & Water Commission

(IBWC)

Rio Grande Border, TX

3238.5 5326 6783.5 6976 9946

All Agencies:

Land Mobile Common, Nationwide

27575 27585

Disaster Communications

OPERATION SECURE
(State Emergency Capability Using Radio Effectively)

All frequencies 1 kW maximum power, USB; Contiguous 48 United States only

Fixed/Base/Mobile

2326	2511	7477
2411	2535	7480
2414	2569	7802
2419	2587	7805
2422	2801	7932
2439	2804	7935
2463	2812	
2466	5135	
2471	5140	
2474	5192	
2487	5195	

Federal Communications Commission (FCC)

The following frequencies are assigned to the FCC for RTTY (60 wpm/400 Hz normal shift) point to point communications and rarely SSB. No CW has been copied recently. Inversion of bits 2 or 3 provide encryption; the code is changed at 0000 UTC. HF repeaters are used.

Fixed Station Network and Miscellaneous Units

Chan	Freq	Use
1	2220	Mobiles (CW)
1A	2295	Monitoring stations (RTTY)
2	4483	Mobiles (CW/SSB)
2A	5133	Monitoring stations (CW)
2B	5373	Monitoring stations (RTTY)
3	7790	Mobiles (CW/SSB/RTTY)
3A	7604	Monitoring stations (CW)(Repeater)
4	10655	Mobiles (CW)

4A	10902	Monitoring stations (CW/SSB/RTTY) (Repeater)
5	13830	Monitoring stations (CW/SSB/RTTY) (Repeater)
5A	13493	Monitoring stations (RTTY)
5B	13990	Mob/Mon stations (CW/RTTY/SSB)
5C	13992	Monitoring stations (RTTY)
6	18050	Mobiles (CW)
6A	19230	Monitoring stations (RTTY) (Repeater)
7	22964	Mobiles (CW)
7A	23035	Monitoring stations (RTTY) (Repeater)

Call	ID	Location
KAA60	GI	Grand Isle, NE (repeater site)
KCA35	BE	Belfast, ME
KGA91	LR	Laurel, MD
KGA93	WA	Washington, DC Headquarters
KIA84	PS	Powder Springs, GA
KIA85	FL	Vero Beach
KKA59	DS	Douglas, AZ
KKA60	KA	Kingsville, TX
KMB27	LV	Livermore, CA
KOA56	FE	Ferndale, WA
KQA62	AL	Allegan, MI
KUN70	WP	Waipahu, HI
KWC41	AN	Anchorage, AK
WWQ20	SS	Sabana Seca, PR

Department of Commerce

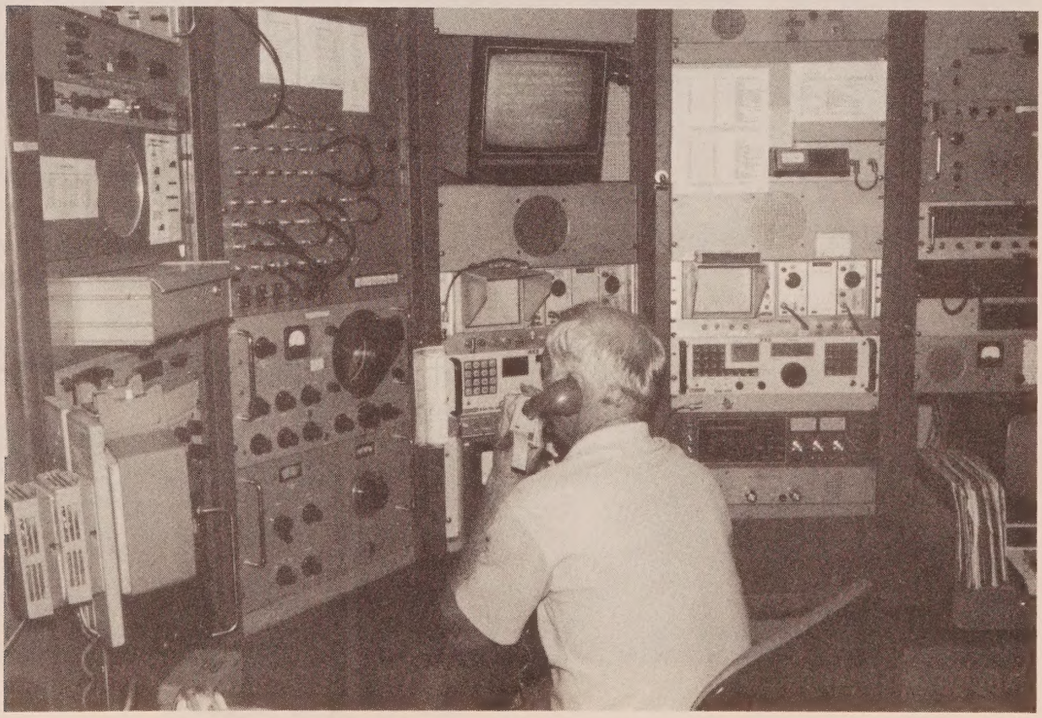
National Oceanic and Atmospheric Administration (NOAA)

Coast Radio Stations

These stations communicate with U.S. Government vessels in the Atlantic Ocean, Gulf of Mexico, Pacific Ocean, Gulf of Alaska, and Hawaii areas.

Atlantic Stations

Stn	Agcy	Location
KVH	NOS	Norfolk, VA
KVK	NOS	Miami, FL
KAC	NMFS	Woods Hole, MA
KAF	"	Sandy Hook, NJ



One of two FCC monitoring positions in Powder Springs, Georgia

FEDERAL GOVERNMENT

KBR	"	Beaufort, NC
KHW	"	Pascagoula, MS
KAI	"	Galveston, TX
KAG	AOML	Miami, FL

Pacific Stations

Stn	Agcy	Location
KVJ	NOS	Seattle, WA
WWD	NMFS	La Jolla, CA
KAB	NOS	Honolulu, HI

Great Lakes Station

Stn	Agcy	Location
KVR	NOS	Detroit, MI

Alaska Station

Stn	Agcy	Location
KWL	NMFS	Auke Bay, AK

USCG Atlantic Area

Station	Location
NMF	Boston, MA
NMN	Portsmouth, VA
NMA	Miami, FL
NMG	New Orleans, LA

USCG Pacific Area

Station	Location
NMC	San Francisco, CA
NOX	Adak, AK
NOJ	Kodiak, AK
NMO	Honolulu, HI
NMT	Barrow, AK
NRV	Guam
NMJ	Ketchikan, AK
NMQ	Long Beach, CA

Agency Abbreviations

AOML	Atlantic Oceanographic and Meteorological Laboratories
NMFS	National Marine Fisheries Service
NOS	National Ocean Survey
OOE	Office Ocean Engineering
USCG	United States Coast Guard

Frequency Assignments

CW Frequencies (Simplex)

4213.5	12640.5
6320.25	16641
8364	16854.5
8427	22252
8427.5	22251.5

CW (Two Frequency Simplex)

Coast Frequency	Ship Frequency
6503.5	6265.6
8714	8353
13080.5	12500.5
17206.5	16669.5
22570.5	22201.5

Duplex Radiotelephone (USB)

Coast Frequency	Ship Frequency
4379.1	4084.7
4431.8	4137.4
4434.9	4140.5
6509.5	6203.1
8753	8229.1
8802.6	8278.7
13141.1	12370.3
13156.6	12385.8
17267	16494.1
17270.1	15497.2
22695.2	22099.2
22701.4	22105.4

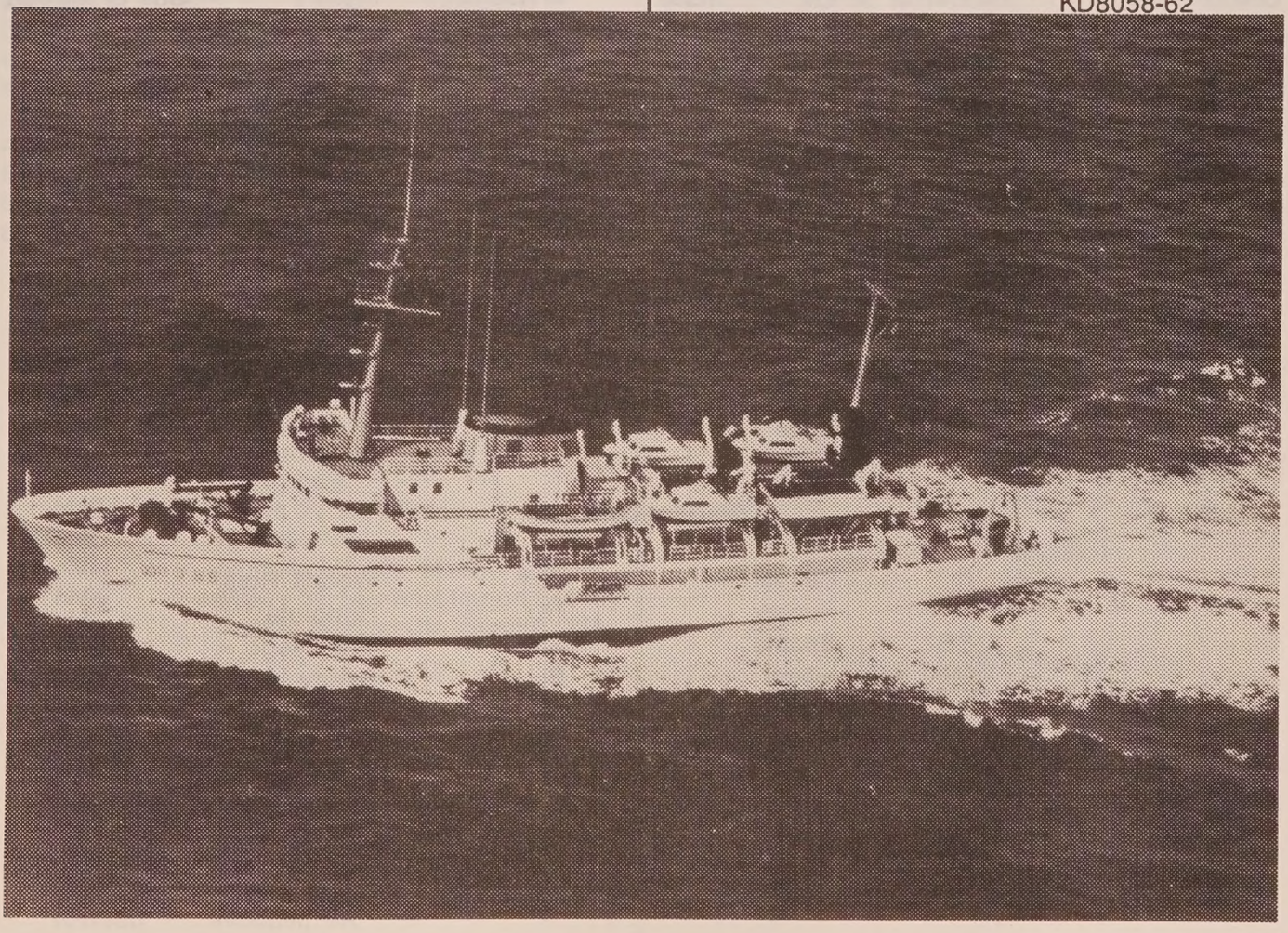
(NOTE: NOAA vessels also use USB simplex on limited coastal channels 4A-22E - see index)

NOAA Callsigns

Location	Callsign
Atlantic Marine Center	WZ3050-59
Pacific Marine Center	WZ3060-70
Office of Fleet Ops	KA8133,34
Geodesy	KE8200-26
	KF3712-3802
Field 742	WS2535-37
Photogrammetry	WZ2531-34
	KD7998,99
	KE8227-34

	KF3700-11
Auka Bay, AK	KWL21
Anchorage, AK	KWL59
College, AK	KAW53,
	KD7992-3
Kodiak, AK	KWL38
	KD8057
Juneau, AK	KWL36
Sitka, AK	KAW57
St George, AK	KWL41
St Paul, AK	KWL44
Pt Barrow, AK	KAW54
Valdez, AK	WZ2520
Tucson, AZ	KAW51
	KD7996,7
Los Angeles, CA	WZ2550-52
San Diego, CA	KDX
San Francisco, CA	WZ2553-59
San Miguel Is, CA	KF7424
Tiburon	KD3977
Terminal Island	KHU
Guam	
Honolulu, HI	WZ2593-4
	KD7994-5
	KAW52,68

French Frigette Shoals	KAW65
Pearl & Hermes Reef	KAW64
	KAW63
New Orleans, LA	WZ2538-39
New York, NY (MESA)	KAW61
	WZ2517-19
Beaufort, NC	KD8051
Rockville, MD	KCU721-27
(Security)	KCU729
(Motor Pool)	KCU730
	KA8132
	KD7986-91
Boston, MA	WZ2513-16
Detroit, MI	WVW
(Portable Units)	KD8000-50
Portland, OR	WZ2570-71
(Same as RAINIER)	
Prescott, OR	KD8055,56
	KD8063
Galveston & Pt Arkansas,TX	KA8129-31
	KD8052-54
Fredericksburg, VA	KAW56
Norfolk, VA	KAW60
Seattle, WA	KAW56,66
	KAW67
	KD8058-62



NOAA ship Fairweather

FEDERAL GOVERNMENT

NOAA FLEET

Vessel	Length Ft	*Port	*Hull Des	Ship Callsign	Callsign	Location
OCEANOGRAPHER	303	SE	R101	WTEP	WZ2633-42	
DISCOVERER	303	SE	R102	WTEA	WZ2608-19	S.E. Alaska
RESEARCHER	278	MI	R103	WTER	WZ2540-49	E. Caribbean
SURVEYOR	292	SE	S132	WTES	WZ2560-69	Oregon Coast
FAIRWEATHER	231	SE	S220	WTEB	WZ2645-50	Gulf of Alaska
RAINIER	231	SE	S221	WTEF	WZ2570-86	Gulf of Alaska
MILLER FREEMAN	215	SE	R223	WTDM		Gulf of Alaska
MT MITCHELL	231	NK	S222	WTEG	WZ3015-29	N. Atlantic
PIERCE	163	NK	S328	WTEQ	WZ2598-2602	Delaware Bay
WHITING	163	NK	S329	WTEW	WZ2603-07	Honduras
MCARTHUR	175	SE	S330	WTEJ	WZ3030-38	Seattle, WA
DAVIDSON	175	SE	S331	WTEK	WZ3039-49	Oregon Coast
OREGON II	170	PA	R332	WTDO		Gulf of Mexico
GEORGE B. KELEZ	177	NK	R441	KNBG	WZ2006	
ALBATROSS IV	187	WH	R342	WMVF	WZ2158	N. Atlantic
TOWNSEND CROMWELL	164	HU	R443	WTDF		Hawaiian Is.
DAVID STARR JORDAN	171	SD	R444	WTDK		S. California
DELAWARE II	156	SH	R445	KNBD	WZ2035	N. Atlantic
FERREL	133	NK	S492	WTEZ	WZ2628-30	Norfolk, VA
RUDE	90	NK	S590	WTET	WZ2625-27	N. Atlantic
HECK	90	NK	S591	WTEY	WZ2620-22	N. Atlantic
OREGON	100	SE	R551	KNBH	WZ2022	
JOHN N COBB	94	SE	R552	WMVC	WZ2023	Gulf of Alaska
CHAPMAN						Gulf of Mexico
MURRE II						Gulf of Alaska

Abbreviations

R	Research	WH	Woods Hole
S	Survey	HU	Honolulu
SE	Seattle	SD	San Diego
MI	Miami	SH	Sandy Hook
NK	Norfolk	KK	Kodiak
PA	Pascagoula		

NOTE: WCGS used as a radio callsign for broadcast to all NOAA ships; i.e. National Emergency.

Woods Hole (MA) Oceanographic Institute

KC2XGF to all areas
2398 6970

KXC713 to Atlantis II (KADC)
to Knorr (KCEJ)
to Oceanus (WYN4084)

2613 4431.8 6509.5 8753 8802.6
13141.1 16590.2 17267 22695.2

National Marine Fisheries Service

Scripps Bucom Fisheries, La Jolla, CA

Callsign	Frequency
WWD	8789.7

(NOAA) National Weather Service (NWS)

2463.5	6509.5	12894	17280.9
2614	6516.8	13065	17902
2638	7880*	13142	22025.9
3333	8282.6	13180.4	22099.4
4140.9	8646	16485.9	22106.4
4380	8754	16566.4	22109.4
4404.4	8800.6	16573.4	22700
4433.2	12401.4	17084	22429.4
6211.8	12422.4	17175	23651.4
6379	12425.9	17268	
6393			

* *Weather frequency*

Coast Stations

KAB	Honolulu Ocean Inst.
KAF	Atlantic Highlands, NJ
KAI	San Juan, PR
KBR	Beaumart, SC
KHW	Pensacola, FL
KJS	Kings Point, NY
KVD	Norfolk, VA
KVH	Norfolk Atlantic Marine Center
KVK	Miami SE Marine Support Facility
KVJ	Pacific Marine Ctr, Seattle, WA
KVR	Detroit, MI
KAW51	Tucson, AZ
KAW52	Honolulu, HI
KAW53	College, AK
KAW54	Pt Barrow, AK
KAW55	Seattle, WA
KAW56	Fredricksburg, VA
KAW57	Sitka, AK
KAW58	Guam
KAW60	Norfolk, VA
HRK6A	Swan Island

Hurricane hunter technician preparing a dropsonde

National Hurricane Center
Air to Ground Hurricane Reconnaisance

Two aircraft are WP-3, variation of Navy P-3 Orion reconnaissance aircraft, a modification of the Lockheed Electra. Aircraft can stay aloft for 12 hours at altitudes up to 24,000 feet, and cruise at 300 knots.

Frequencies USB	
3407	10015
5562 sec.	11398
6673	13267 (Pri daytime)
8876	21937

Callsign	Location
KJY74	Miami, FL

NWS Emergency Backup Network
(Also Regional Fire Net)

Ch	Freq
1	2776
2	3363
3	5925
4	6977.5 (Pri)
5	9947.5
6	14729

TVA Construction Division

Channel	Frequency
1	2094.4
2	4195.0
3	6223.0
4	8295.6
5	12433.7

Federal Aviation Administration (FAA)

Regional Networks

All communications USB except where noted.

New York/Santa Maria

New York (WSY70)	Santa Maria, Azores (CSY)
4475	3194
8130	5402
12196	8045
16280	12240
23211	16234
20130	

San Juan - Local Hurricane Net

WRW70

2196 7508.5

Balboa/Bogota (ISB)

Balboa, PNZ (WHZ70)	Bogota, Colombia (HKG210)
3161.5	2845
4572	4610
9796.5	9950

Balboa/Guayaquil (ISB)

Balboa, PNZ (WHZ70)	Guayaquil, Ecuador (HC2G)
8119	4476
5162.5	6810
10437.5	10163
12188.5	14607.5

Balboa/San Andres

Balboa, PNZ to San Andres, Colombia

(WHZY0)		(CSZ)
3390	5805	7405

Southwest Region Emergency Net

3331	4055	5860
6870	8125	13626

Station	Callsign
Albuquerque, NM	KGH23
Albuquerque NM (ARTCC)*	KEA37
Baton Rouge, LA	KAO31
Beaumont, TX	KED67
Brownsville, TX	KCA37
Chickasha, OK	KOS41
Corpus Christi, TX	KJB35
Denton, TX	KKD50
Farmington, NM	KGA46
Fort Worth, TX (RCCC)*	KDM47
Fort Worth, TX (ARTCC)*	KBQ25
Houston, TX	KIC30
Houston,TX(ARTCC)*	KMU31
Lafayette, LA	KCK47
Lake Charles, LA	KCA29
Martinsburg, WV	KIT88
Mesa Rica, NM	KDM44
Midland, TX	KAP24
Mineral Wells, TX	KPA54
Mobile Units	
New Orleans, LA	WEK71
Oklahoma City, OK (Center)	KIA21
Palacios, TX	KGC36
San Antonio, TX	KIA48
Santa Fe, NM	KBY33
Shreveport, LA	KOB92
Tucumcari, NM	KAB34
Wichita Falls,TX	KPA54

** Scene of accident investigation*

Southern Region Emergency Net

(Check in Tuesdays 9:45 Eastern on 6870 LSB or 7475 USB)

4055 7475

Station	Callsign
Anniston, AL	KLE78
Asheville, NC	KKW51
Atlanta, GA (S.O.)	KDM49
Atlanta, GA	KUV62
Augusta, GA	KUZ66
Bimini, Bahamas	KLB79
Birmingham, AL	KVA93
Bristol, TN	KKW23
Brunswick, GA	KUQ95
Charleston, SC	KUR64
Chattanooga, TN	KAN34
Columbia, SC	KUZ31
Columbus, GA	KVA92
Covington, KY	KUX58
Crestview, FL	KUU58
Crossville, TN	KKX70
Daytona Beach, FL	KXG85
Dotham, AL	KUR68
Elizabeth City,NC	KAO28
Fayetteville, NC	KLJ61
Florence, SC	KUS79
Fort Lauderdale,FL	KKY53
Fort Myers, FL	KWF53
Fulton Co., GA	KLM44
Gainesville, FL	KUA21
Greenwood, MS	KKY54
Greer, SC	KBZ80
Gulfport, MS	KEG95
Hampton, GA(ARTCC)	KDM50
Hattiesburg, NS	KUR87
Hilliard, FL (ARTCC)	KJK79
Huntsville, AL	KVA95
Jackson, MS	KVA94
Jacksonville, FL	KGC34
Jacksonville, FL	WHX49
Key West, FL	KLD95
Knoxville, TN	KFC87
London, KY	KNH47
Louisville, KY	KUW42
Lynch, KY	KEF63
Macon, GA	KVA27
McComb, MS	KLA23
Melbourne, FL	KXC70
Memphis, TN(ARTCC)	KDM52
Memphis, TN	KLE86
Meridian, MS	KDM51
Miami, FL (ARTCC)	KMA47
Mobile,AL	KMJ20
Montgomery, AL	KLC48
Myrtle Beach, SC	KUR65
Nashville, TN	KUV70
New Bern, NC	KUR66
Orlando, FL	KOR82
Panama City, FL	KSE31
Raleigh, NC	KCG58
Raleigh, NC	KCA58
San Juan,PR(ARTCC)	KDM45
San Juan, PR	WRW70
Sarasota, FL	KVH40
Savannah, GA	KBN72
St Croix, VI	KUU97
St Petersburg, FL	WHX48
St Thomas, VI	KSB53
Tallahassee, FL	KKA36
Tampa, FL	KEX63
Tuscaloosa, AL	KLM37
Valdosta, GA	KUR67
Vero Beach, FL	WHX47
Wilmington, NC	KDQ21

Eastern Region Backup Net

3331 3353 3395 4055
5860 7475 8120 8125

Station	Callsign
Albany, NY	KKY71
Buffalo, NY	KKZ75
Hagerstown, MD	KLM92
National Airport, VA	KKW89
Newark, NJ	KLC46
Norfolk, VA	KLD46
Pittsubrgh, PA	KKW22
Roanoke, VA	KLD57
Starr Hill, NY	KLM94

Central Region Emergency and Defense Readiness Net

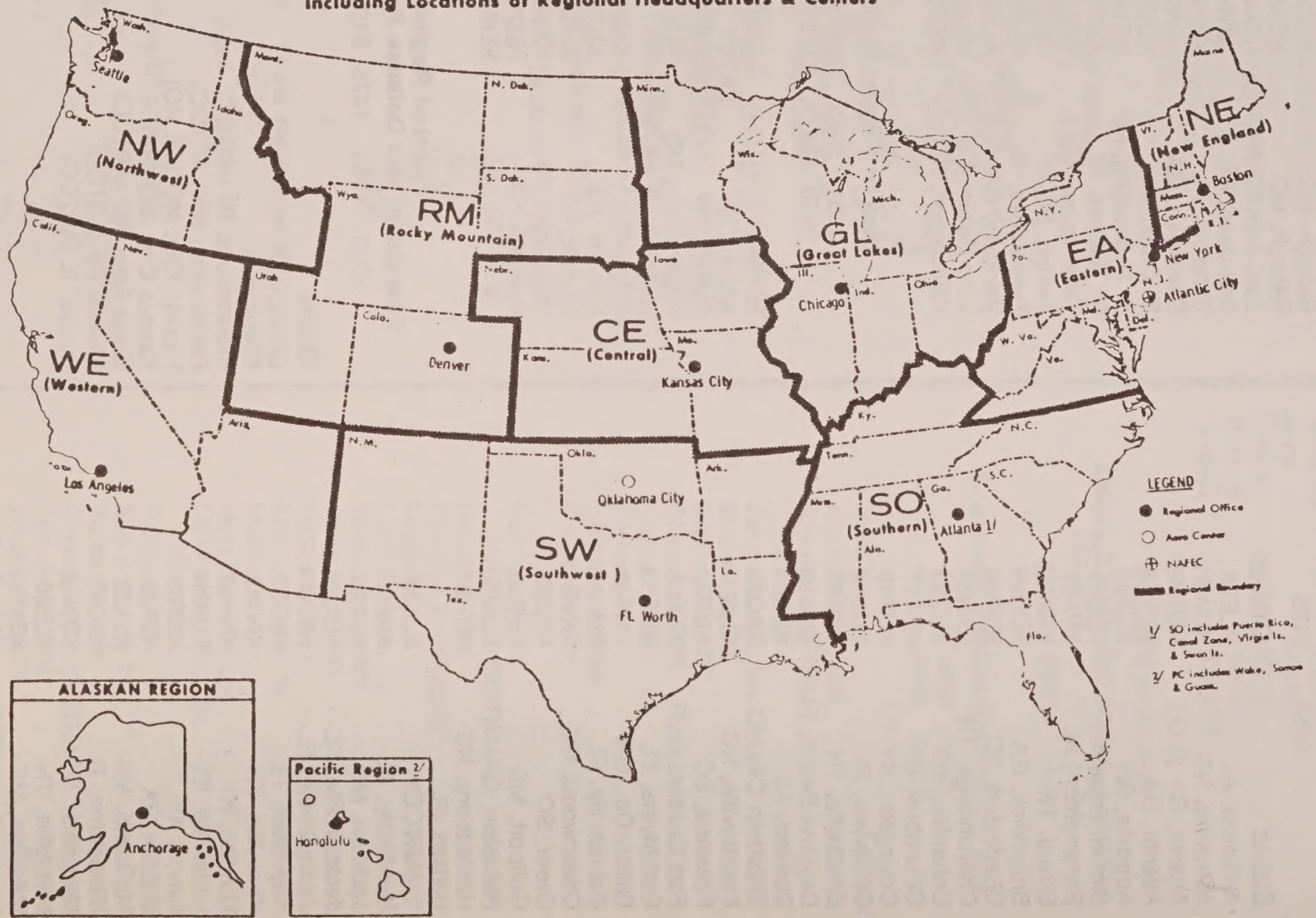
3353 4055 7475 8125 13626

Station	Callsign
Chicago, IL	KLG27
Chicago, IL	KLE72
Indianapolis, IN (ARTCC)	KLB48
Farmington, MN (ARTCC)	KCJ20
Kansas City, MO (CE RO)	KKU40
Kansas City, MO (RS)	KBC28
Great Falls, MT (ARTCC)	KIN80
Olathe, KS (ARTCC)	KKA82
Aurora, IL (ARTCC)	KJB96

Department of Transportation - Federal Aviation Administration

FAA REGIONAL BOUNDARIES

Including Locations of Regional Headquarters & Centers



Inter-Regional Emergency and Defense Readiness Net
(And ARTCC Emergency Net)

4055 7475 8125
13626 16280 20852

Regional Net

Station	Callsign
Washington, DC(HQ)	KEM80
Atlantic City, NJ	KLN80
Martinsburg, WV	KIT88
Jamaica, NY	KJK82
Atlanta, GA (SO)	KDM49
Fort Worth, TX	KDM47
Kansas City, MO	KKU40
Oklahoma City, OK	KIA21
Los Angeles, CA	KJK73
Anchorage, AK	KDM53
Honolulu, HI	KGA32
Ronkonkomo, NY	KJK76
Burlington, MA	WHX45
Denver, CO	WHX46
Des Plaines, IL	WHX51
Seattle, WA	WHX20
Kenai, AK	WSX70
Jacksonville, FL	KJK79

ARTCC Net

Station	Callsign
Oberlin, OH	KLA25
Nashua, NH	KLD70
Islip, NY	KCD73
Leesburg, VA	KJK80
Fort Worth, TX	KBQ25
Houston, TX	KMU31
Albuquerque, NM	KEA37
Miami, FL	KMA47
Hilliard, FL	KJK79
Hampton, GA	KDM50
Memphis, TN	KDM52
Aurora, IL	KJB96
Indianapolis, IN	KLB48
Olathe, KS	KKA82
Farmington, MN	KCJ20
Great Falls, MT	KIN80
Auburn, WA	KCJ70
Longmont, CO	KCP63
Salt Lake City, UT	KDC20
Palmdale, CA	KJK77
Fremont, CA	KMR96

New England Region Emergency and Defense Readiness Net

3331 3353 3395 4055 5860
7475 8120 8125 13626 16280

Station	Callsign
Augusta, ME	KKU70
Bangor, ME	KKU80
Burlington, MA	WHX45
Houlton, ME	KKU56
Islip, NY (New York,ARTCC)	KCD73
Jamaica, NY	KJK82
Leesburg,VA (Washington,ARTCC)	KJK80
Nashua, NY	KJK81
Portland, ME	KKU54
Ronkonkomo, NY	KJK76

Great Lakes Region Emergency and Defense Readiness Net

4055 7475 8125 13626

Station	Callsign
Aurora, IL	KJB96
Battlecreek, MI	KLM43
Bismarck, ND	KKU50
Cleveland, OH	KLD69
Columbus, OH	KLB79
Des Plaines, IL	WHE51
Detroit, MI	KLE80
Indianapolis, IN	KLB48
Farmington, MN	KCJ20
Grand Rapids, MI	KLD27
Green Bay, WI	KEB24
Lansing, MI	KAE21
Milwaukee, WI	KKY53
Minneapolis, MN	KLD73
North Canton, OH	KLF21
Oberlin, OH	KLA25
Pierre, SD	KKU51
St. Paul, MN	KGJ42
Vandalia, OH	KLA21

Illinois Maintenance Net

Station	Callsign
Moline, IL	KKZ74
Springfield, IL	KBU29

Indiana Maintenance Net

Station	Callsign
Indianapolis, IN	KLD58
South Bend, IN	KKY72

FEDERAL GOVERNMENT

Intra-Alaska Voice Backup Net
(Weather Collection)

3253

Station	Callsign
Cordova	KAC26
Eklutna	KIS70
Kotzebue	KEJ28

Bettles/Chandalar Lake, AK Off-Airways Weather Collection Net

2758 4055 5357.5

Station	Callsign
Bettles, AK	KBE43
Chandalar Lake, AK	KEE67
Cordova	KAC26

FAA Southeastern Alaska Maritime Mobile Net

4139.5

Station	Callsign
Sisters Island, AK	KAS24
Level island, AK	KQA59
Coghlan Islands,AK	KGC38
Juneau, AK	KAJ28
Gustavus, AK	KGG20
Haines, AK	KAH94

Alaska FAA Net

7475 LSB

Station	Callsign
Anchorage	KBX44
Barrow	KBA29
Bethel	KBB54
Big Delta	KGD82
Cold Bay	KCD20
Cordova	KAC26
Deadhorse	KLK70
Dillingham	KKE47
Fairbanks	KBE94
Farewell	KCF31
Galena	KCG31
Gulkana	KGA25
Homer	KCH20
Ilianna	KAI82
Juneau	KAJ28
Kenar	WSX70
Ketchikan	KKY21
King Salmon	KCK35
Kodiak	KAK20
Kotzebue	KEJ28
McGrath	KCR60
Middleton Is.	KCB20
Murphy Dome	KLH70
Nome	KBN58
Northway Junction	KBL85
Sitka	KAW27
Talkeetna	KAV83
Unalakleet	KAU51
Valdez	KLL45
Yakutat	KKW92

Alaska Regional Scene of Accident

3253 5286 5357.5 5906 7375

Alaska Defense Readiness Net

1790 3253 5357.5 7375

Western Region Emergency Net

3353 4055 4060 7475 13903.5

Station	Callsign
Fort Worth, TX	KDM47
Fremont, CA (Oakland ARTCC)	KMR96
Kansas City, KS	KKU40
Los Angeles, CA	KJK73
Los Angeles, CA	KOJ77
Olathe, KS	KKA82
Palmdale,CA(ARTCC)	KJK77
Seattle, WA	WHX20

Pacific Region Emergency, Administration, and Maintenance Net

3353 6870

Station	Callsign
Honolulu, HI	KGA32
Hilo, HI	KBH49
Lanai, HI	KLI51
Kahului, Maui, HI	KCU94
Keahole, HI	KLI52
Lihue, Kauai, HI	KAL38
Mt Kaala, HI	WHX44
Diamond Head, HI (ARTCC)	KCC97
Molokai, HI	KLK48

Northwest Region Emergency and Maintenance Net

4055 7475

Station	Callsign
Auburn, WA	WHX44
Boise, ID	WHX41
Eugene, OR	WHX25
Idaho Falls, ID	WH42
Klamath Falls, OR	WHX36

Medford, OR	WHX26
Moses Lake, WA	WH44
Olympia, WA	WHX30
Pasco, WA	WHX33
Pocatello, ID	WHX37
Portland, OR	WHX31
Redmond, OR	WHX27
Seattle, WA(RCCC)	WHX20
Spokane, WA	WHX30
Spokane, WA	WHX42

Rocky Mountain Region Emergency Net

4055 4060 7475 8125 13626

Station	Callsign
Billings, MT	KIM33
Bismarck, ND	KKU50
Butte, MT	KKV33
Casper, WY	KAI82
Cedar City, UT	KAX36
Denver, CO	KCP63
Fargo, ND	KDM46
Grand Forks, ND	KEA20
Great Falls, MT	KIN80
Great Falls, MT	KKW91
Huron, SD	KBR27
Jackson, WY	KKW27
Longmont,CO(ARTCC)	KLP63
Miles, MT	KKX67
Minot, ND	KGC28
Phoenix, AZ	KPS50
Rapid City, SD	KCE24
Rock Springs, WY	KKW90
Salt Lake City, UT	KDC20
Sioux Falls, SD	KBC28
Trinidad, CO	KGF97

Pacific Region/Scene of Accident Command and Control Network

6874 14464 20480 27625

Station	Callsign
Honolulu	KGA32
Diamond Head	KCC97
Guam	KCD72
Pago Pago	KDM48

Honolulu to Kwajalein

(FACSIMILE)

Honolulu (KVM70)

9982.5 11090 16135 23331.5

Samoa/Fiji

(ISB)

Pago Pago, Samoa (KDM48)	Nadi, Fiji (ZQD)
3235.5	4027
5362.5	5010
8122	5085
10985	7956
12180	8084
15674	9410
18764	10563
	10985
	14950
	18615
	23240

Honolulu/Samoa

(ISB)

Honolulu (KVM70)	Samoa (KDM48)
3336	3394
5220	5925
5945	7770
6850	9785
9846	11121.5
9982.5	17669
11471	23345
14885	
16135.6	
17621	
23474	

Samoa Airport Link

Tafuna (KDM48)	Faleolo (ZKFA)
2544	3158
6895	6776

Intra-Alaska Air to Ground

(USB)

FSS service for Barrow, McGrath, Cold Bay, Cordova, Kotzebue, and Ketchikan.

2861 5631

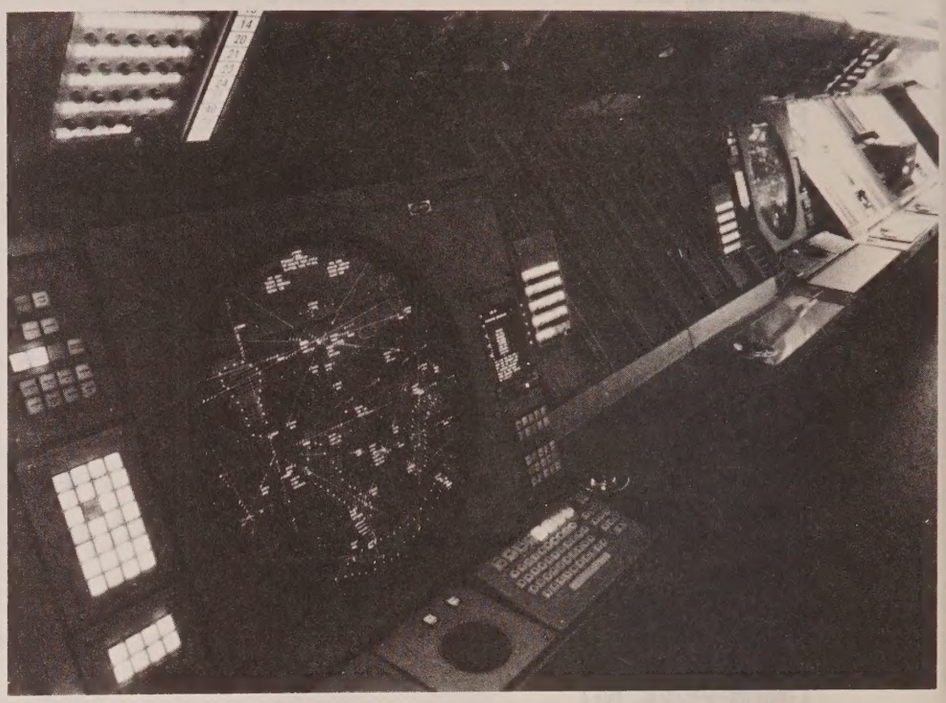
Telfers Island, PNZ (WHZ70)

5161 5805 10436 12187

Tactical Identifiers

SNOWBALL	Tactical identifier for regional offices
TRADEWIND	Tactical identifier for Washington DC administrative offices

Air controller position in a modern FAA air traffic control center.



A modern Air Traffic Control Center

Department of Justice

FBI

RTTY/USB Network
(Tone-encoded Squelch)

2332	5913	9238.5 XE	13660	17603
2808.5 XA	6594	9311.5	14460	18173
4030	6952.5	10550	14495	22345
4616	7778.5 XD	10915	14534	23402
5014	7903.5	11075	15955	23675
5058.5 XC	9015	11210	16376	23875
5388.5	9183.5	11488.5	17405	27740

Callsigns and Locations
(Test Monday 9-10 am local time)

KAG78	Kansas City, MO
KAG82	Minneapolis, MN
KAG98	Omaha, NE
KEC71	Buffalo, NY
KEC96	New York, NY
KIG67	Atlanta, GA (NCS)
KIG73	Birmingham, AL
KIG81	Charlotte, NC
KIG91	Knoxville, TN
KIH67	Louisville, KY
KIH73	Memphis, TN
KIH98	Mobile, AL
KII50	
KII83	
KII95	
KIJ22	Miami, FL
KIJ44	
KKI99	San Antonio, TX
KKJ22	San Francisco, CA
KKJ44	
KKJ45	
KKJ67	Albuquerque, NM
KKJ88	New Orleans, LA
KKJ98	Oklahoma City, OK
KMG22	San Diego, CA
KMG27	San Diego, CA
KMG44	San Diego, CA
KOG55	Las Vegas, NV
KOG69	Butte, MT
KOG71	Phoenix, AZ
KOG93	Salt Lake City, NJ
KOH22	Seattle, WA
KSC63	Indianapolis, IN
KSC71	Milwaukee, WI
KSD61	Chicago, IL
KSG73	
KUR27	Honolulu, HI

Standard Time/Frequency Stations Worldwide

(All 24 Hours Except When Shown)

Callsign	Location	Frequency and Schedule
ATA	New Delhi, India	5000 (1230-0330) 10000 15000 (0330-1230)
BPM	Xian, China	10000 15000 (Weekdays 1600-2200, 0300-0600)
BSF	Taiwan, Rep of China	5000 15000 (0100-0900)
CBV	Valparaiso, Chile	4298 8677 (1155-1200, 15555-1600, 1955-2000, 0055-0100)
CHU	Ottawa, Canada	3330 7335 14670
DAM	Elmshorn, FRG	4625 (2355-0006, 1155-1206 (Sep 21-Mar 20); 6475.5 (2355-0006 March 21-Sep 20); 8638.5 (1155-1206, 2355-0006 Sep 21-March 20); 12763.5 (2355-0006 March 21-Sep 20); 16980.4 (1155-1206, 2355-0006 Sep 21-March 20)
DCF77	Mainflingen, FRG	77.5
DGI	Oranienburg, GDR	177 (0559:30-0600, 1159:30-1200, 1759:30-1800)
DIZ	Nauen, GDR	4525
EBC	Cadiz, Spain	6840 (1025-1055) 12008 (0959-1025)
FFH	Chevannes, France	7500 (Weekdays 0800-1625)
FTA91	St.Andre-de-Corcy,FR	91.15 (0755-0800, 0855-0900, 0925-0930, 1255-1300, 1955-2000, 2055-2100, 2225-2230)
FTH42	Pontoise, France	7428 (0900, 2100)
FTK77	Pontoise, France	10775 (0800, 2000)
FTN87	Pontoise, France	13873 (0930, 1300, 2230)
GBR	Rugby, UK	16 (0255-0300, 0855-0900, 1455-1500, 2055-2100)
HBG	Prangina, Switzerlnd	75
HD210A	Guayaquil, Ecuador	3810 (0500-1700); 5000 (1700-1800); 7600 (1800-0500)
HLA	Taejon, Korea	5000 (Weekdays 0100-0800)
IAM	Rome, Italy	5000 (Weekdays 0730-0830, 1030-1130. One hour earlier in summer.)
IBF	Turin, Italy	5000 (Weekdays 0645-0700, 0845-0900, 0945-1000, repeated hourly to 1800. One hour earlier in summer.)
JG2AS	Chiba, Japan	40
JJY	Koganei, Japan	2500 5000 8000 10000 15000
LOL	Buenos Aires, AR	5000 10000 15000 (1100-1200, 1400-1500, 1700-1800, 2000-2100, 2300-2400); 4856 8030 17180 (0055-0100, 1255-1300, 2055-2100)
LQB9	Planta Gral Pacheco	8167.5 (2200-2205, 2345-2350)
LQC20	Planta Gral Pacheco	17551.5 (1000-1005, 1145-1150)
OBC	Callao, Peru	485 8650 12307 (1555-1600, 1855-1900, 0055-0100)
OLB5	Podebrady, Czech.	3170
OMA	Liblice, Czech.	50 2500 (Ten minute intervals)
PKI	Jakarta, Indonesia	8542 (0055-0100)
PLC	Jakarta, Indonesia	11440 (0055-0100)
PPE	Rio de Janeiro, Brazil	8721 (0025-0030, 1125-1130, 1325-1330, 1825-1830, 2025-2030, 2325-2330)
PPR	Rio de Janeiro, Brazil	435 4244 8634 13105 17194.4 22603 (0125-0130, 1425-1430, 2125-2130)
RBU	Moscow, USSR	66.666... (For five minutes after each hour, 000-2200)
RCH	Tashkent, USSR	2500 (0530-0400) 5000 (0200-0400, 1400-1730, 1800-0130) 10000 (0530-0930, 1000-1330)
RID	Irkutsk, USSR	5004 10004 15004
RIM	Tashkent, USSR	5000 (5 min intervals 0000-0130, 0215-0350, 1815-2400); 10000 (5 min intervals 0530-0930, 1015-1330, 1415-1730)
RKM	Irkutsk, USSR	10004 (5 min intervals 0000-0110, 1351-2400); 15004 (5 min intervals 0151-1310)
RTA	Novosibirsk, USSR	10000 (0200-0500, 1400-1730 1800-0130) 15000 (0630-0930, 1000-1330)
RTZ	Irkutsk, USSR	50 (For 5 minutes after each hour, 0100-2400)
RWM	Novosibirsk, USSR	4996 9996 14996
RW166	Irkutsk, USSR	200 (2200-2100)

FEDERAL GOVERNMENT

RW76	Novosibirsk, USSR	272 (2200-2000)
VPS	Kowloon, Hong Kong	500 (Even hours)
VPS8	Kowloon, Hong Kong	4232.5 (Odd hours 1100-2100)
VPS22	Kowloon, Hong Kong	22536 (Odd hours 0100-0900)
VPS35	Kowloon, Hong Kong	8539 (Odd hours)
VPS60	Kowloon, Hong Kong	13020.5 (Odd hours 0100-1500)
VPS80	Kowloon, Hong Kong	17096 (Odd hours 2100-1300)
VWC	Calcutta, India	434 4286 (1625-1630); 12745 (0825-0830)
WWV	Ft Collins, CO	2500 5000 10000 15000 20000
WWVB	Ft. Collins, CO	60
WWVH	Kaui, HI	2500 5000 10000 15000
XSG	Shanghai, China	522.5 6454 8487 12954 16938 (0255-0300, 0855-0900)
Y3S	East Berlin, DDR	4525
YVTO	Caracas, Venezuela	6100
ZLF	Wellington, New Zeal	2500 F(Wednesday 0100-0400)
ZSC	Capetown, S.Africa	418 4291 8461 12724 17018 22455 (0755-0800, 1655-1700)
ZUO	Olifantsfontein,S AF	2500 5000 (1800-0400)
4PB	Colombo, Sri Lanka	482 8473 (0553-0600, 1323-1330)
---	Belconnen, Australia	6449 12982

Standard Time Frequency Cross Reference

Freq	Station Callsigns
16	GBR
20.5	UNW3 UPD8 UQC3 USB2 UTR3
23	UNW3 UPD8 UQC3 USB2 UTR3
25	UNW3 UPD8 UQC3 USB2 UTR3
25.1	UNW3 UPD8 UQC3 USB2 UTR3
25.5	UNW3 UPD8 UQC3 USB2 UTR3
40	JG2AS
50	OMA, RTZ
60	WWVB
66.666..	RBU
75	HBG
77.5	DCF77
91.15	FTA91
177	DGI
200	RW166
272	RW76
418	ZSC
434	VWC
435	PPR
482	4PB
485	OBC
500	VPS
522.5	XSG
2500	BPM JJY OMA RCH WWV WWHV ZLF ZUO
3170	OLB5
3330	CHU
3810	HD210A
3842	VPS8
4228	CBV
4244	PPR
4286	VWC
4291	ZSC
4298	CBV
4525	DIZ Y3S
4625	DAM
4856	LOL2
4996	RWM
5000	ATA BSF HD210A HLA IAM IBF JJY LOL1 RCH RIM WWV WWVH ZUO
5004	RID
5430	BPM
6100	YVTO
6449	(Belconnen, Australia)
6454	XSG
6475.5	DAM
6840	EBC
7335	CHU
7428	FTH42
7500	VNG FFH
7600	HD210A
8000	JJY
8030	LOL
8167.5	LQB9
8461	ZSC
8473	4PB
8487	XSG
8539	VPS35
8542	PKI
8558	CCV
8634	PPR
8638.5	DAM
8650	OBC
8677	CBV
8721	PPE
9351	BPM
9996	RWM
10000	ATA BPM JJY LOL1 RCH RIM RTA WWV WWVH
10004	RID RKM
10775	FTK77
11173.5	EBC
11440	PLC
12008	EBC
12307	OBC
12724	ZSC
12745	VWC
12763.5	DAM
12954	XSG
12982	(Belconnen, Australia)
13020.5	VPS60
13105	PPR
13873	FTN87
14670	CHU
14996	RWM
15000	ATA BPM BSF JJY LOL RTA WWV WWVH
15004	RKM
16938	XSG
16980.4	DAM
17018	ZSC
17096	VPS80
17180	LOL
17194.4	PPR
17551.1	LQC20
20000	WWV WWVH
22455	ZSC
22536	VPS22
22603	PPR

International Criminal Police Organization (INTERPOL)

Virtually every western country and one Communist nation--Yugoslavia--belong to this mutual-assistance informational exchange.

While INTERPOL is forbidden by its charter to engage in religious, political, racial or espionage cases, nearly all other classes of criminal investigation are pursued.

Member countries provide National Central Bureaus for cooperative exchange of information relating to drugs, counterfeiting, fugitives and other illegal activities. In England, Scotland Yard provides the facilities and in the United States, the Treasury Department.

Virtually 100% of the HF communications are conducted by RTTY (TOR-ARQ and FEC). Underlined frequencies are most often reported. U.S. participation is via cable and satellite.

Frequencies

2593	7401	13820	21785
2840	7532	14607.5	21807.5
3593	7832	14707	24072
3705	7906	14817.5	24110
3714	8038	14827	27845
4444	8045	15502.5	
4632.5	9105	15592	
4837.5	9200(Pri)		
4855.5	9285	15684	
5104	9821	15738	
5208	10295	18190	
5305.5	10390(Pri)	18380(Pri)	
5895	11538	19130	
6792	13520	19360	
6905	13747	19405	

Alphabetic Callsign List - National Central Bureaus

Callsign	Station-Bureau
AVD204	Ranchi, Argentina
AYA47	Buenos Aires, Arg.
CNP/CNT	Rabat, Morocco
CSJ26	Lisbon, Portugal
DHA33/DEB	Wiesbaden, FDR
DUN356	Manila, Phillipines
EEQ	Madrid, Spain
EEQ20	Las Palmas, Canary Is
EP5X	Tehran, Iran
FSB57	HQ Paris, France
GMP	West Wickam, Eng.
HEP39/58	Zurich, Switzerland
HMA22	Seoul, Korea
HK3M-TI	Bogota, Colombia
HSQ	Bangkok, Thailand
IUV81	Rome, Italy
JPA21-27	Tokyo, Japan
JPA56	Nagoya, Japan
LJP20	Oslo, Norway
LXF50	Luxembourg
LZH7	Sofia, Bulgaria
OAV84-87	Lima, Peru
ODW22	Beirut, Lebanon
OEO35	Vienna, Austria
OGX	Helsinki, Finland
ONA20	Brussels, Belgium
OWS4	Copenhagen, Denmark
PDB2	Utrecht, Holland
PPC55/PYZ2	Brasilia, Brazil
SHX	Stockholm, Sweden
SUA81	Cairo, Egypt
SXP	Athens, Greece
TCC2	Ankara, Turkey
TTR103-148	N'Djemena, Chad
TUW220	Abidjan, Ivory Coast
VRD	Hong Kong
XJD48	Ottawa, Canada
XJE57	Almonte, Canada (RCMP)
YO99	Bucharest, Rumania
YVZ32	Caracas, Venezuela
ZPZ	Asuncion, Paraguay
3VA	Tunis, Tunisia
4NX7-25	Belgrade, Yugoslavia
4XP41	Tel Aviv, Israel
4XP63	Jerusalem, Israel
5BP6	Nicosia, Cyprus
50P25	Lagos, Nigeria
5TP25	Nouakchott, Mauritania
5YG	Nairobi, Kenya
7RA20	Algiers, Algeria
8UF75	New Delhi, India
9TK21	Kinshasa, Zaire
EEQ21	Santa Cruz, Canary Is

CANADA

Royal Canadian Mounted Police

(Mostly RTTY, some SSB; gradually being phased out)

KHZ	PROVINCE
2788	Alberta NWT
4765	NWT
4776.5	NWT Alberta Nfld
4785	Yukon NWT BC Alta Man Ont PQ NS WashDC
4798.5	BC Manitoba
4812.5	Sask
5445	Alta Sask Man Ont PQ
6792	Paris
7780	Yukon NWT BC Alt Sask Man Ont PQ NB NS Nfld Paris
9105	NWT Alta Ont NB NS Nfld Paris
9200	Paris
10390	Paris
14620	Yukon,NWT,Alta, Man,Ont,PQ,NB, NS,Nfld
14817.5	Paris
19130	"
19360	"
21785	"
21807.5	"
24110	"

RCMP Call Signs: Eastern Arctic

XJA 22	Cambridge Bay
XJD 33	Pond Inlet
XJD 34	Pangnirtung
XJD 58	Sachs Harbour
XJD 270	Nanisivik
XJD 276	Sanikilauq
XJD 503	Snowdrift
XJD 559	Franklin
XJD 563	Holman Island
XJD 563	Igloolik
XJD 597	Wrigley
XJD 711	Tungsten
XJD 717	Paulatuk
XJE 74	Spence Bay
XJE 78	Grise Fiord
XJE 223	Norman Wells
XJE 270	Sanikilvaq
XJE 272	Inuvik
XJE 273	Rae
XJE 274	Yellowknife
XJE 275	Aklavik
XJE 330	McPherson
XJE 331	Tuktoyaktuk
XJE 332	Coppermine
XJE 333	Good Hope
XJE 335	Norman
XJE 361	Baker Lake
XJE 415	Fort Smith
XJE 423	Liard
XJE 441	Rankin Inlet
XJE 441	Resolute Bay
XJE 442	Frobisher Bay
XJE 443	Clyde River
XJE 459	Lake Harbour
XJE 460	Igloclik
XJE 473	Cape Dorset
XJE 474	Simpson
XJE 476	Resolution
XJO 43	Eskimo Point
Route 9	Broughton Island

Ministry of Natural Resources

SSB

4460	Northwest Region
4520	
4535	Northcentral Region
4580	
4880	Other Regions
5170	
5240	
5540	Air to Ground
9172	Air to Ground, Long Range

Quebec Dept of Natural Resources

3368.5 4982

Canada Energy, Mines & Resources

SSB

4441	NWT
4474	Yukon,NWT,BC,Alta,Sask, Man,Ont,PQ,Nfld
4532	Rankin Inlet Drilling Operation (NWT)
4765	Echo Bay Mines, Great Bear Lake (NWT)
4982	Yukon,BC,Ont,PQ,NB,NS, Nfld
5341.5	NWT,PQ
7347.5	NWT,BC,Alta,Sask,Man, Ont,PQ,Nfld

Environment Canada
SSB

2221.5	Atmospheric, PQ
2727.5	Atmospheric, PQ NWT
2319.4	Pacific Coast
2508	NWT,PQ
2598.5	Pacific coast
2617.5	Yukon,NWT,Pacific coast
2846.5	Pacific coast
3191.5	Atlantic Coast
4554	Yukon,BC,Nfld
4861.5	Atmospheric, PQ
4982	NS
5124	Pacific coast
5811.5	Atmospheric, PQ NWT
9813	Atlantic Coast
12126.5	NWT,Pacific coast
27655	Nationwide

Quebec Hydro

SSB	RTTY
4625.5	4496.5
4883.5	4625.5
5346.5	5013.5
5347.5	6771.5
6771.5	
7306.5	

Dept of Fisheries

2752 4462 4510

Hunters and Trappers Association
SSB

5031	(Eastern Arctic; Inuit language)

Wildlife Service (NWT)
SSB

5053	(4PM local call-in)
XLI 334	Frobisher Bay
XLI 336	Arctic Bay
XLK 201	Coral Harbour
XLK 202	Resolute Bay
XMC 808	Regional Office
XMC 823	Igloclik
XMD 315	Clyde River
XMD 316	Broughton Island
XMD 317	Cape Dorset
XMD 318	Pangnirtung
XMD 319	Pond Inlet

Communications Canada (DOC)

SSB	RTTY	
Ontario & NS	(Hermes Electronics, Ltd)	
7555.5	Ontario/NS	
8046.5	3174.5	9392.5
9391	3214	11623
13714	3253.5	11636
13717.5	3278	13714
19572.5	4081.5	13717.5
20529.5	4084	14645
22834.5	4573.5	14733.5
23068.5	5107.5	19572.5
25149	5181	20529.5
	5276.5	22834.5
	7555.5	23068.5
	7558.5	25147.5
	8046.5	25150.5
	9389.5	

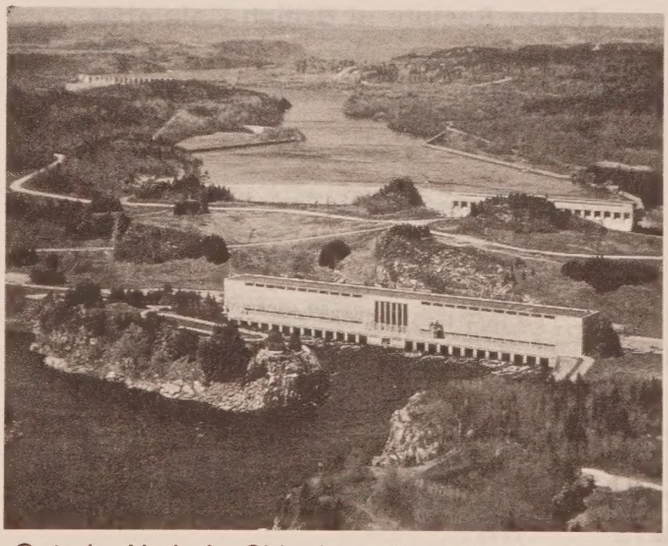
Yukon Radiotelephone
(NorthwesTel Inc.)

USB

Ch.	Base	MobileCall	Location
1	5222.5	5009 CFY79	Ft. Nelson
3	5396	5856 CHB615	Bay River
4	5215	4950 CFY82	Whitehorse

Alma Radio CGD206 (Quebec)
Bush radiotelephone

Ch.	Freq.
1	3166
2	7465
3	5390 (pri)
4	5430 (sec)



Ontario Hydro's Shipshaw Dam in Quebec

FEDERAL GOVERNMENT

Montreal headquarters of Alma Radio, gateway to bush country communications.

Indian Affairs and Northern Development

2247.5	Yukon, NWT, BC, Alta
2508	NWT, PQ
5140	Native Community of Trout Lake (NWT)

Dene Nation (NWT)

2240 4840 4898 4967
5031 5410 5730 6955 9114

Raven Society of British Columbia

SSB

9115.5	(also Nowachant Band Council-XJL970)

Ministry of Transport

Point to Point

SSB

1792	ONT,PQ,NB,NS,NFLD
4885	YUKON,NWT,BC,ALTA,SASK

RTTY

2221.5	PQ
2292	Man PQ
2727.5	PQ,NWT
3273	NWT
4861.5	PQ
4886.5	YUKON,BC
4927.5	PQ,NFLD
5380	NWT,NFLD
5795	NWT
5811.5	PQ,NWT
5885	NWT,LABRADOR
7484	NFLD,REYKJAVIK
7630	PQ,NFLD
7675	NWT,LABRADOR
7742	NWT
7825	NFLD,PQ
8135	NFLD,SHANNON IRELAND
8151.5	NWT
9265	NWT,LABRADOR
10290	NWT
11055	NFLD,REYKJAVIK
11077.5	NFLD,SHANNON IRELAND
11470	PQ,NFLD
11505	LABRADOR,NFLD
11695	NWT,LABRADOR
13595	NFLD,PQ
13700	PQ,NFLD
16356	NFLD,SHANNON IRELAND

Marine

SSB

1792	ONT,PQ,NB,NS,NFLD
2104.9	NWT,BC,NB,NS,PEI,NFLD
2201.5	BC

RTTY

4171	BC
4173.5/4353	BC,NS
4174.5/4354	BC,NS
4769	NFLD,REYKJAVIK
4990	PQ,NFLD (Air-Nav)
6259.5/6497.5	BC,NS
6260.5/6498.5	BC,NS
8340.5	BC
8355.5/8716.5	BC,NS
8356/8717	BC,NS
12501	BC
12510.5/13090.5	BC,NS
12511.5/13091.5	BC,NS
16675.5/17212.5	BC,NS
16676/17213	BC,NS
22207.5/22576.5	BC,NS
22221/22590	BC,NS

Ships

2119.4	ATLANTIC,GT LAKES
2206/2583.4	EAST COAST
2207.4/2583.4	EAST COAST
2237	EAST COAST
2340/2458	PACIFIC COAST
2670	GREAT LAKES,SHIPS TO CONTACT US COAST GUARD

Aviation

RTTY

2221.5	PQ
4861.5	PQ
5115.5	PQ

Maintenance and Operations

RTTY

2377.5	BC
5115.5	NWT,MAN,ONT,PQ
5352.5	BC
7318	BC
11019.5	BC
16051.5	BC

Northwest Territory Forestry Dept.

USB

4270 5730

AUSTRALIA

Australian Conservation and Emergency Services

2470	Country fire authority(VIC)
2488	"
2512	"
2580	"
2580	Emergency fire service(SA)
2600	Country fire authority(VIC)
2612	Forestry commission (VIC)
2620	Country fire authority(VIC)
2620	Emergency fire service (SA)
2668	"
2680	"
2692	Country fire authority(VIC)
2708	Forestry commission (VIC)
2720	Emergency fire service(SA)
2728	Forestry commission (VIC)
2740	Country fire authority(VIC)
3375	State emergency services
3393	Country fire authority(VIC)
3720	State emergency service
3836	Country fire authority(VIC)
3848	"
4428.7	Coast stns working freq.
4450	Forestry commission(NSW)
4510	Emergency fire service(SA)
4524	Country fire authority(VIC)
4571	State emergency service
4574	"
4880	Forestry commission (VIC)
5345	"
5370	"
5450	"
6940	"
2752	Emergency fire service (SA)
2780	Country fire authority(VIC)
2780	Emergency fire service (SA)
2792	Forestry commission (VIC)
2808	Emergency fire service (SA)
2836	"
2840	Forestry commission (VIC)
2850	Country fire authority(VIC)
3152	Emergency fire service (SA)
3155	St Johns search and rescue
3158	Emergency fire service (SA)
3196	Forestry commission (NSW)
3260	Country fire authority (VIC
3290	"
3340	"
3360	"

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Worldwide Operational Control

All worldwide HF voice communications are upper sideband and are authorized every 3 kilohertz in the following ranges:

2851-3019	8816-8960
3401-3497	10006-10096
4651-4696	11276-11396
5451-5475	13261-13357
5481-5676	17901-17967
6526-6682	21940-21997

Worldwide Search and Rescue

(Scene of Action):

3023 5680

Long Distance Operational Control (LDOC)

While HF-SSB communications are not generally used for regular operations by civilian airlines inside a country's borders (VHF and UHF AM is the authorized mode), it is the only means of communication between international aircraft and distant airports.

Tones preceding some transmissions comprise SELCAL (selective calling) which keeps an aircraft's receiver squelched until activated by a call directed to it. Tone frequencies are designated "Red A" through "Red S" (312.6-1479.1 Hz).

Worldwide air route traffic control centers (ARTCCs) are listed below with their allotted frequencies:

AREA 1: EUROPE AND ASIA

Paris, France
3010 6637 11351 13351 17916 21940

London, England
3497 5535 5921 10072 13333 17922 21946

Prague, Czechoslovakia
3497 5532 8924 10027 13351 17940 21967

Tel Aviv, Israel
3010 6637 8924 13351 17940 21952

Madrid, Spain
5529 8936 10027 13327 17940 21967

Amsterdam, Holland
3010 5532 8924 13336 17940 21973

Frankfurt, Germany
3010 4687 6637 10078 13327 17931 21979

Hamburg, Germany
10078 13327

Berne, Switzerland
3010 4654 6643 8936 10069 13324 17931 21988

Dublin, Ireland
3010 5532 8924 13351 17916 21952

Rome, Italy
4687 5532 10027 13336 17940 21952

Stockholm, Sweden
5541 8930 11345 13342 17916 21997

Lisbon, Portugal
3010 5532 8924 13336 17940 21952

Moscow, Tashkent, Khabarovsk, USSR
5529 8924 10030 13345 17940 21958

Brussels, Belgium
5529 8924 10078 13351 17940

Warsaw, Poland
4687 8924 11351 13345 17940 21967

Budapest, Hungary
5532 8930 11351 13336 17940 21973

Las Palmas, Conakry
5529 8936 10027 13327 17940 21967

Athens, Greece
3010 6637 10078 13327 17916 21979

Berlin, Germany
3010 5529 8930 10030 13351 17916 21973

Belgrade, Yugoslavia
3010 5532 11351 13336 17916 21940

Bucharest, Roumania
3497 4687 10027 13345 17931 21952

Valetta, Malta
3497 4687 10078 13327 17931 21967

Larnaca, Cyprus
6637 10078 13351 17931 21979

AREA 2:
NORTH AMERICA AND CENTRAL AMERICA

New York, US / San Juan, PR
3494 6640 11342 13330 17925 21964

Houston, TX
5529 10075 13330 17940 21964

San Francisco, Honolulu, USA
3013 6640 11342 13348 17925 21964

Toronto, Can.
3007 6646 10027 13339 17919 21985

Vancouver, Canada
3007 5544 8927 13339 17934 21985

AIRCRAFT

Santo Domingo, Dominican Republic
5529 8936 10027 13348 17934 21985

Havana, Cuba
3007 5544 8927 13339 17934 21985

Mexico City/Metamoros/Tijuana, Mexico
3007 5544 8927 13339 17919

Merida, Mexico
3007 5544 8927 11354 13339 17919

Curacao, Netherlands Antilles
3007 5544 8936 13339 17919 21985

Cayman, Cayman Islands
6646 8936 13339

AREA 3: PACIFIC

Auckland, New Zealand
3007 6637 10072 13333 17940 21970

Hong Kong, HK
3007 6637 8921 13333 17940 21970

Sydney, Australia
3007 6637 8921 10078 13342 17922 21970

Bombay, Indonesia
3007 6637 8930 10072 13351 17916 21949

Manila, Philippines
3007 6637 11351 13351 17916 21949

Tokyo, Japan
4687 6637 11342 13324 17928 21949

Singapore, Singapore
6637 8930 10078 13333 17934 21949

Beijing, China
3007 6637 8930 11351 13351 17934

Jakarta, Indonesia
3007 6637 8921 10072 13351 17916 21970

Karachi, Pakistan
4687 6637 8930 11351 13342 17940 21970

Suva, Fiji
3007 6637 10072 13333 17916

Nauru, Nauru
6637 11351 17916 21949

Colombo, Sri Lanka
4687 6637 8921 13324 17922 21949

Seoul, Korea
3007 4687 10072 13333 17916 21970

Bangkok, Thailand
3007 4687 8930 13351 17922 21970

Rangoon, Burma
3007 4687 11351 13342 17934 21949

Kathmandu, Nepal
6637 13342

AREA 4: SOUTH AMERICA

Buenos Aires, Argentina
3010 6643 10030 13327 17919 17928 21955

Lima, Peru
3010 5535 8924 11345 17937 21976

Santiago, Chile
3010 6643 10030 13345 17937 21991

Rio de Jan., Brazil
3010 5541 8924 10069 17919 21991

Caracas, Venezuela
3010 6643 8924 11345 17937 21976

Pt. of Spain, Trinidad
3010 5535 8924 13336 17928 21955

Montevideo, Uruguay
3010 5535 8924 13336 17919 21976

Bogota, Colombia
3010 5535 11345 13336 17928 21955

San Salvador, El Salvador
3010 6643 10030 13345 17937 21976

Easter Island
3010 13345

AREA 5: MIDDLE EAST

Blantyre, Malawi
3013 5544 8933 13339 17931 21982

Kinshasa, Zaire
3013 5538 10033 13339 17931 21982

Nairobi, Kenya / Entebbe, Uganda / Dar Es Salaam, Tanzania
3013 6640 8927 13339 17931 21982

Addis Ababa, Ethiopia
3013 5538 8927 13339 17931 21982

Asmara, Asm.
3013 5538 8927 13339 17931 21982

Bahrain, Bah.
3013 5538 11354 13339 17931 21943

Kuwait, Kuw.
3013 6040 10033 13330 17931 21994

Beirut, Lebanon
3013 5538 10075 13330 17931 21943

Lagos, Nigeria
3013 5532 8927 13339 17931 21982

Monrovia. Liberia
3013 6646 11348 13348 17937 21961

Jeddah/Dhahran/Riyadh, Saudi Arabia
3013 5544 8927 13339 17925 21994

Mahe, Seychelles
3013 5544 8933 13339 17931 21982

Tunis, Tunisia
3013 6640 10033 13339 17925 21994

Cairo, Egypt
3013 6640 8933 17931 21982

Kabul, Afghanistan
3013 6640 10075 13330 17925 21982

Djibouti, Dji.
3013 5544 8933 13339 17925 21994

Muscat, Oman
3013 5538 10033 13330 17931 21943

Tehran, Iran
3013 5532 11348 13348 17937 21961

Harare, Zimbabwe
3013 5532 10075 13330 17937

Luanda, Angola
5544 8927 11354

AREA 5: AFRICA

Kigali, Rwanda
3013 6640 10075 13339 17931 21982

Lusaka, Zambia
3013 6640 10075 13330 17937 21982

Antananarivo, Madagascar
3013 5538 8927 13330 17931 21982

Dubai, UAE
10075 13348

Abu Dhabi, UAE
5532 10033 13348 17931 21943

Mauritius, Maur.
3013 5538 8933 13348 17937 21982

Algiers, Algeria
3013 5532 6646 8933 10075 11354 13348 17937 21943

Ougadougou, Biafra
3013 5544 6640 10033 21943

Abidjan, Ivory Coast
5538 8927 13330

Johannesburg, South Africa
3013 5532 8933 11354 13330 17925 21943

Regional and Domestic Air Route Areas

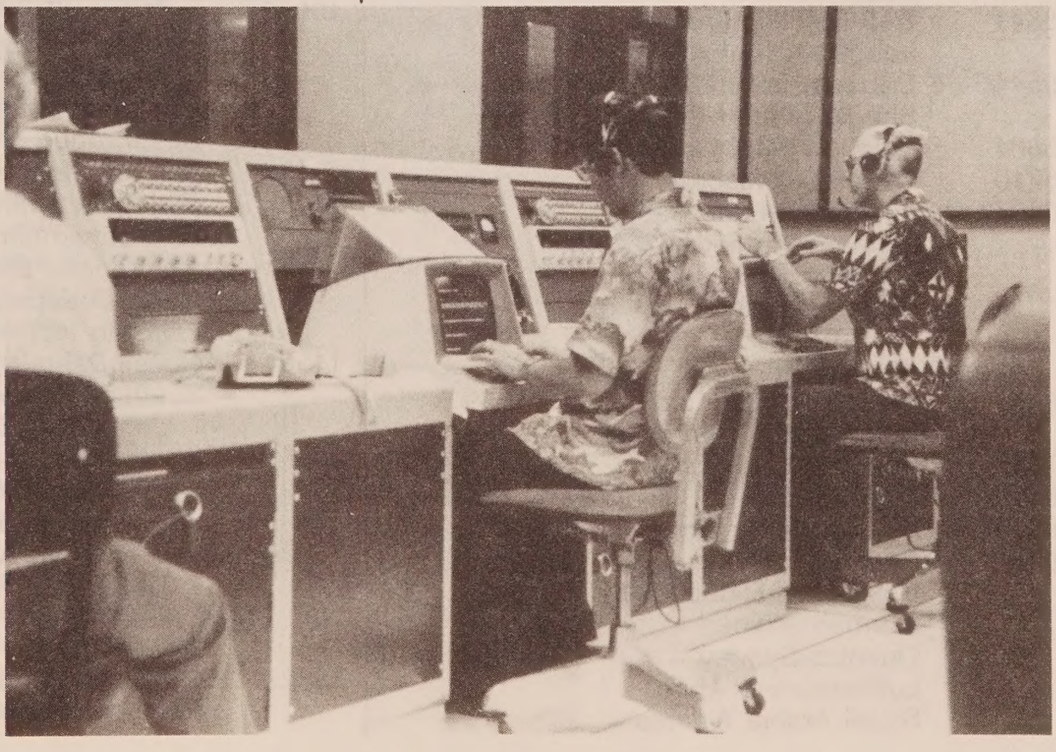
(RADARA)

(authorized to governments, subcontracted to air carriers)

Airline Company Frequencies

In order to maintain communications with their international flights, many airline companies operate HF networks. These may be company-owned, or leased from contractors like Aeronautical Radio Incorporated (ARINC).

International callsigns are registered in accordance with the Table of International Callsign Prefixes in the Glossary.



Honolulu ARINC Communications Center

AIRCRAFT

Company-Owned Network Frequencies

kHz	User
3007	Cubana-Havana
	Quantas-Sydney
	KAL-Seoul
	Thai Airways-Bangkok
3010	KLM-Amsterdam
	Lufthansa-Frankfurt
	Olympic Airways-Athens
	Air France-Paris Radio
	Avianca-Bogota
	El Al-Tel Aviv
	Vairg-Rio De Janeiro
	Sabena-Brussels
	Aerolineas Argentinas-Buenos Aires
3458	Rainbow Radio - Canada
3497	British Airways-London
4654	Swissair-Berne Radio
4687	KLM-Amsterdam
	Alitalia-Rome
	Thai Airways-Bangkok
5529	Universal Aviation-Houston
	Iberia-Madrid/Las Palmes
	Sabena-Brussels
	Aeroflot-Moscow
5532	KLM-Amsterdam
	South African Airways-Johannesburg "Springbok"
	Alitalia-Rome
5535	British Airways-London "Speedbird"
5536.5	Ethiopian Airlines
5538	Gulfair-Bahrain
	MEA-Beirut
5541	SAS-Stockholm Radio
	Vairg-Rio de Janeiro
5544	Cubana-Havana
	Saudia Airlines-Jeddah
5604	Rainbow Radio - Canada
5710	Aeroflot - Moscow
6637	Air France-Paris Radio
	Lufthansa-Frankfurt
	Olympic Airlines-Athens
	Quantas-Sydney
	El Al-Tel Aviv
	JAL-Tokyo
6643	Swissair-Berne Radio
	Aerolineas Argentineas
7541	Ethiopian Airlines
8819	Rainbow Radio - Canada
8895	Air Algerie-Algiers
8921	British Airways-London "Speedbird"
	Dusseldorf Radio LTU
	German Airlines
	Quantas-Sydney
	Lufthansa-Frankfurt
	Saudi Arabia Airlines
8924	KLM-Amsterdam
	El Al-Tel Aviv
	Vairg-Rio de Janeiro
	Sabena-Brussels
	Aeroflot-Moscow
	CSA-Prague
	LOT-Warsaw
	Pluma-Montevideo
8927	Cubana-Havana
	Saudia Airlines-Jeddah
	Ethiopian Airlines-Addis Ababa
8930	SAS Stockholm R.-Stockholm
	Thai Airways-Bangkok
	Malev-Budapest
	El Al-Tel Aviv
8933	South African Airways-Johannesburg "Springbok"
8936	Swissair-Berne Radio
	Iberia-Madrid
	Aero Condor-Cartogena
8952	KLM (maintenance)-Amsterdam
9003	Alia-Amman Arnrnan
10027	Iberia-Madrid/Las Palmes
	Alitalia-Rome
10030	Aerolineas Argentineas
	Aeroflot-Moscow
	Interflug-Berlin
10069	Swissair-Berne Radio
	Vairg-Rio de Janeiro
10072	British Airways-London "Speedbird"
	KAL-Seoul
	Air India-Bombay
	Air New Zealand-Auckland
10075	Universal Aviation-Houston
	MEA-Beirut
10078	Lufthansa-Frankfurt
	Olympic Airways-Athens
	Sabena-Brussels
	Quantas-Sydney
	CSA-Prague
11197	Aeroflot-Moscow
11256	Ethiopian Airlines "Holloway"
11345	SAS-Stockholm Radio
11351	Air France-Paris Radio
	Malev-Budapest
	Pakistan Int'l Airlines-Karachi
11354	Gulfair-Bahrain
	South African Airways-Johannesburg "Springbok"
11401	Continental, Caroline & Marshall Is.
13205	Aeroflot-Moscow
13285	Rainbow Radio - Canada
13324	LTU German Airlines-Dusseldorf Radio
	Swissair-Berne Radio
	JAL-Tokyo
13327	Lufthansa-Frankfurt
	South African Airways-Johannesburg

	Olympic Airways-Athens
	Aerolineas Argentineas-Buenos Aires
	Middle East Airlines-Beirut
13330	Universal-Houston
	Cubana-Havana
13333	British Airways-London "Speedbird"
	KAL-Seoul
13336	KLM-Amsterdam
	Malev-Budapest
	Avianca-Bogota
	Alitalia-Rome
13339	Cubana-Havana
	Gulfair-Bahrain
	Saudia Airways-Jeddah
13342	SAS-Stockholm
	Saudia Airways-Jeddah
13345	Aeroflot-Moscow
13351	Air France-Paris Radio
	Interflug-Berlin
	Sabina-Brussels
	El Al-Tel Aviv
17910	Rainbow Radio - Canada
17916	Air France-Paris Radio
	Olympic Airways-Athens
	KAL-Seoul
17919	Vairg-Rio de Janeiro
	Aerolineas Argentineas
17922	Quantas-Sydney
17928	Avianca-Bogota
	Aerolineas Argentineas-Buenos Aires
17931	Swissair-Berne Radio
	Gulfair-Bahrain
17934	Cubana Dispatcho Havana
17940	KLM-Amsterdam
	Universal Aviation-Houston
	Sabina-Brussels
	Iberia-Madrid/Las Palmes
	Alitalia-Rome
	El Al-Tel Aviv
	Aeroflot-Moscow
19904	Aeroflot-Moscow
21940	Air France-Paris Radio
21943	South African Airways-Johannesburg
	Gulfair-Bahrain
	MEA-Beruit
21946	British Airways-London
21949	KAL-Seoul
21952	El Al-Tel Aviv
	Alitalia-Rome
21955	Vairg-Rio de Janeiro
	Aerolineas Argentineas-Buenos Aires
21958	Aeroflot-Moscow
21967	Iberia-Madrid/Las Palmes
	Lufthansa-Frankfurt

New York ARINC Communications Center

	LOT-Warsaw
21970	Quantas-Sydney
	KAL-Seoul
21973	KLM-Amsterdam
	Interflug-Berlin
	Malev-Budapest
21979	Lufthansa-Frankfurt
	Olympic Airways-Athens
21985	Cubana-Havana
21988	Swissair-Berne Radio
	Nigerian Airways-Lagos
21991	Vairg-Rio de Janeiro
21994	Saudia Airways-Jeddah

Aircraft Identifiers

ALIA BASE	Royal Jordanian Airlines
AMSTERDAM	KLM Base
BERNE RADIO	Swissair Base
CEDAR BASE	MEA Base
CLIPPER	Pan Am Aircraft
CUBANA DISPATCHO	Cubana Airlines-Habana
FALCON CTL	Gulfair Base
FRANKFURT CTL	Lufthansa Base
JEDDAH	SAUDI Base
PIARCO RADIO	Port of Spain, Trinidad
RAINBOW RADIO	Canada (charter airline)
SPEEDBIRD	British Airways
SPRINGBOK("JoBerg")	South African Airways
STOCKHOLM RADIO	SAS Base
UNIVERSAL	Universal Services-Houston

Additional RADARA Frequencies

South Pacific	Africa		Indian Ocean
3425	2851	6673	3425
6553	5652	8870	4657
8846	6559	8873	8879
11339	6574	8888	

Major World Air Route Areas

(MWARA)

ARINC Frequencies and Regions

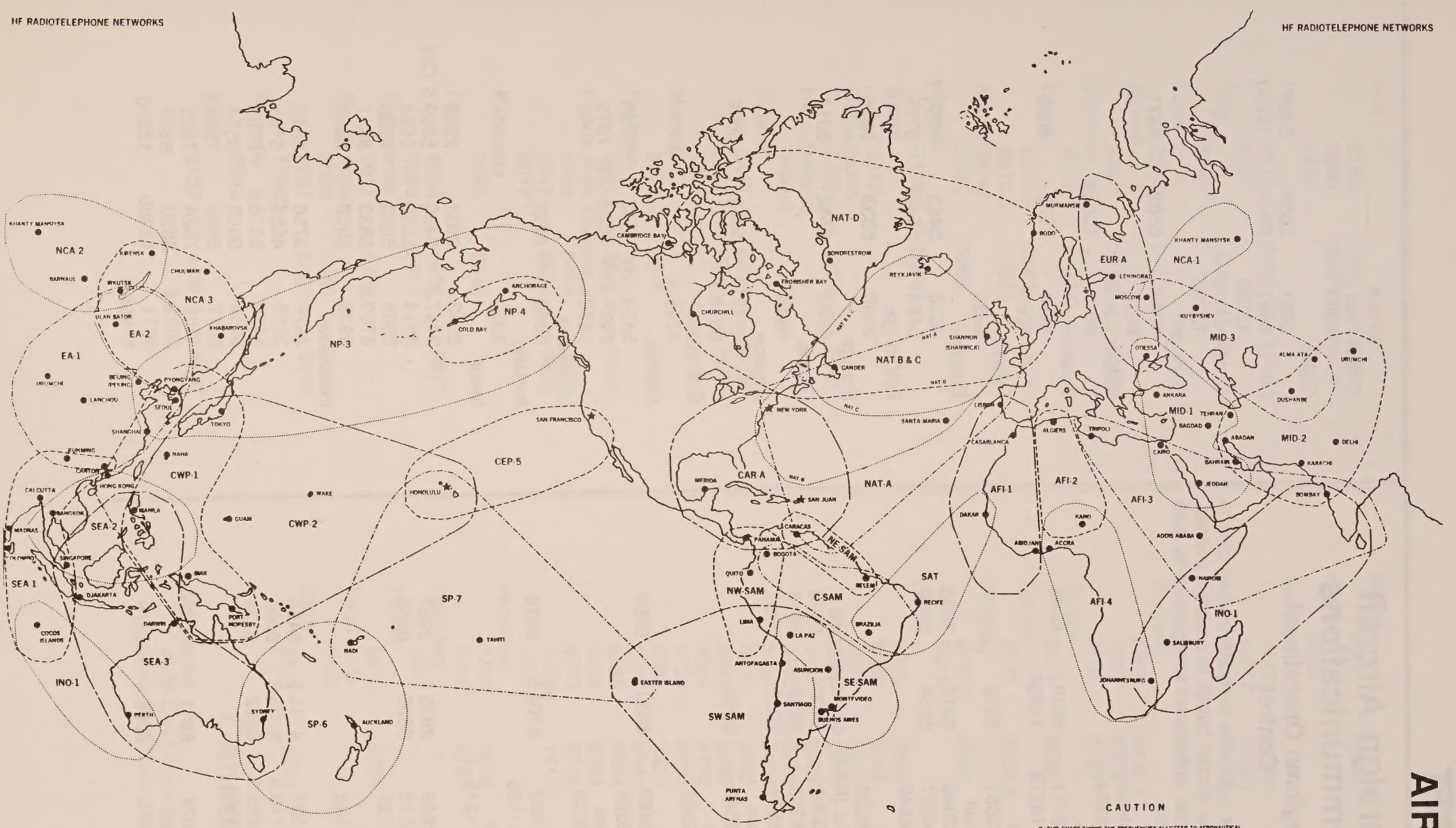
CEP-1	CEP-2	SEA-1	SEA-1/3	SEA-2/ EA-2	CWP	NP	SP	W-SAM
3413	5547	3016	3470	3485	2998	2932	3467	2944
5574	11282	6571	6556	5649	4666	5628	5643	4669
8843	13288	8897	10066	5655	6532	6655	8867	6649
13354	17904	10042	11396	8942	8903	8951	13261	10024
17904		13297	13318	11396	11384	10048	17904	11360
			17907	13309	13300	11330		17907
				17907	17904	17904		
						13273		

NCA-1	NCA-2	NCA-3	E&C SAM	SAT-2	CAR-A	NAT-A	NAT-B
3019	2851	3004	3479	2854	2887	3016	2899
5646	4678	5664	5526	5565	5550	5598	5616
13315	6592	10039	8855	11291	6577	8825	8864
17958	10096	13303	10096	13315	8846	13306	13291
	17958	17958	13297	17955	8918	17946	17946
			17907		11396		
					13297		
					17907		

NAT-C	NAT-D	AFI-1/ SAT-1	AFI-2	AFI-3/ MID-2	AFI-4	EUR-A	MID-1
2962	2971	3452	3419	3467	2878	3479	2992
5649	4675	6535	5652	5658	5493	5661	5667
8879	8891	8861	8894	10018	8903	6598	8918
13306	11279	13357	13273	11300	13294	10084	13312
17946	13291	17955	17961	13288	17961	13288	
	17946			17961		17961	

MID-3	INO-1	SW PACIFIC ISLANDS	CENTRAL AMERICA COMMON	MELANESIA COMMON
2944	3476	3008	5568	2861
4669	5634	3460	10017	5498
6631	8879	6575		5666
8951	13306	8924		8917
11375	17961	11319		
17961				

HF RADIOTELEPHONE NETWORKS



★ AERONAUTICAL EN ROUTE RADIO STATION OPERATED BY ARINC

● AERONAUTICAL EN ROUTE RADIO STATION OPERATED BY OTHERS

THIS MAP IS NOT SUITABLE FOR NAVIGATIONAL PURPOSES

CAUTION

- THIS CHART SHOWS THE FREQUENCIES ALLOTTED TO AERONAUTICAL (GROUND) STATIONS WITHIN THE BOUNDARIES SHOWN
- NOT ALL STATIONS ON ALL NETWORKS ARE SHOWN ON THESE DIAGRAMS
- NOT ALL FREQUENCIES LISTED ARE IMPLEMENTED AT ALL STATIONS
- ICAO REGIONAL AIR NAVIGATION PLANS SHOULD BE REFERRED TO FOR ADDITIONAL DETAILS
- CURRENT OPERATIONAL DATA MUST BE OBTAINED FROM AERONAUTICAL CHARTS AND NOTAMS

Foreign Aircraft Communications

Regional Operational Control

Many countries authorize discrete frequencies in the international aircraft bands to resident airlines. Some frequencies are shared or regulated by their military agencies.

Afghanistan
6624

Algeria
3411 6638 8896
13273 13304

Angola
2851 5493

Argentina
2346 2972 3008
4667 6554 6666
8842

Azores
8886

Australia (RAAF domestic net)
3008 3460 5498
6533 6633 6675
8896 8936 8952

Bahamas
6540 8959

Bahrain
2992

Bolivia
5469 6638 6659
6666

Botswana
6603

Brazil
6680 6704.5 8816
11195

Bulgaria
11245

Burma
2945 2973 2987
3526 5596 6659
6725

Canada
6540

Chile
4694 4745.5 5454
5710.5 5725.5 6666
7465.5 8842 8926
13304

China
6624 8931 13320

Colombia
5710 6666 8875
8938.4

Costa Rica
8993

Cuba
2681 2854 5461
8907 9001 13280
13296

Czechoslovakia
13296

Denmark
4742 6582 8871
8913

Easter Island
8667 19040

Ecuador
4694 5575 6533
6666

Egypt
4689

England
2838 3453 4550.7
5484 5645 6725

Fiji/Tonga
3460 6533 8846

France
4739 4742 9014

Ghana
6638

Greece
3015 4638 5600
5638

Greenland
4745.5

Guinea
5474 CW 5567 5736
6537 CW 7626 CW 7979
13304.5

Honduras
6540 6927

Iceland
3330

India
2913 2931 2948
3497.2 3499 5509.5 CW
5514 5580 5584
5585 5668 6533
6760.5 6833 8917
8938 8963 8983

Indonesia
3474 3756 3815
3855 4555 5188
5430 5536.5 5596
5659 6552 6554
6617 6659 7587.5
7589 7824 7825
8082.5 8820 8833
8871 13280 13320
17966.5

Iran
3158 3650 5579
5960 6547 6624
7480
Iraq
2972 3800 5710.5
9925
Italy
5682
Jordan
2972 3453
Kuwait
2992 6624 17920
Lebanon
2992 6634.5
Libya
6574.5 6693 6697
6813.5 13273
Madagascar
5484 8854
Mexico
3116 5668
Nepal
5512
Netherlands
3453 3474 5645
New Zealand
3481.5
Nigeria
3411 5493 6638
8896 8962 9960
13273
Norway
3474 5645 6544
Pakistan
2931 5512 6624
Papua New Guinea
3008 5498 5666
6617 8833 8875
8917
Paraguay
2660 8842
Peru
4694 5454 6617
6666 8842
Philippines
6617 6700
Saudi Arabia
3095 3453 5564
6701 8967 8990
17983
Somalia
6552
Spain
3137 4738.5 6737
Sudan
6537 8956
Surinam
6533
Sweden
11222 11345 13342
13942 15685 17916
23210 25035
Syria
2992 3939
Thailand
4668 5491.5 5533
6533 6582 6617
6761 6768
Tunisia
3411 4689
Turkey
2972 6634.5 8896
Uruguay
2445.5 2793 5659
8315
USSR
2325 2868 2876
2882 2888 2895
2904 2924 2952
2966 2972 2976
2987 3024 3046
3102 3152 3439
3460 3462 3495
3905 3906 3918
3925 3930 3940
4694 4712 4736
4738 5250 5445
5491 5533 5557
5596 5642 5645
6536 6554 6603
6624 6704 6724
6743 6745 6748
10089 11192 13220
13555
Venezuela
3725 4045 5695.5
6540 6737 7710
Viet Nam
6557
Yemen
5935 6624
Yugoslavia
5688
Zaire
2851 5493

Canada

Air/Ground
4675 Cambridge Bay, NWT air radio
5245 NWT bush camps

Honduras

Air/Ground

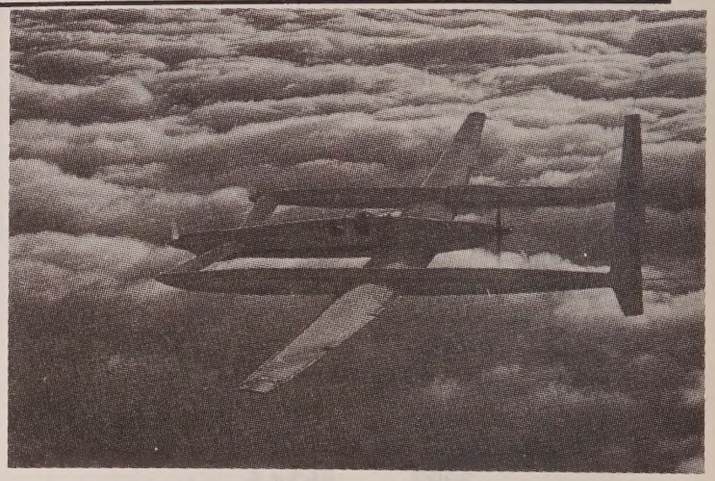
4665 Missionary Aviation Fellowship (1530 daily)
5120 SAHSA Airlines
5490 Missionary Aviation Fellowship
Siguatepeque - 1530 daily)
7400 SOSA Airlines (La Ceiba)

Flight Test

Since communications are a vital part of aerospace technology, adequate radio contact is necessary during many phases of aircraft development.

Callsign Identification

Company	Call	Location
Boeing Aerospace	KOX3	Seattle, WA
	KPS6	Reston, WA
	KTF9	Wichita, KS
	KRU7	Everett, WA
Dayton Aircraft	WCT8	Ft Lauderdale, FL
Grumman	KEC4	Calverton, NY
	KEC6	Bethpage, NY
	KEO8	Bethpage, NY
	KFZ6	Stuart, FL
	KOR3	Stuart, FL
	WMS5	Bethpage, NY
Lockheed	KMA6	Los Angeles, CA
	KMN2	Palmdale, CA
	WSO9	Mountain View, CA
	WDN7	California
McDonnell Douglas	KHR6	USA
	KLP4	Tulsa, OK
	KMF9	Long Beach, CA
	KNU5	Palmdale, CA
	WNS8	St Louis, MO
	WJG3	Yuma, AZ
	WDR3	Yuma, AZ
Rockwell Int'l	KBU6	Cedar Rapids, IA
	KLK2	Newport Beach,CA
	KND9	Los Angeles, CA
	KNI2	Edwards AFB, CA
	KNV8	Los Angeles, CA
	KQS3	Palmdale, CA
Sunair Electronics	KVQ2	Ft Lauderdale,FL
United Technologies	WNY6	Stratford, CT
	KDN5	Stratford, CT
E Systems, Inc.	KRY9	Texas
	WKH2	Greenville, TX
Aero Corporation	KNB3	Lake City, FL



The flight of the Voyager in 1987 utilized many flight test frequencies.

Flight Test Frequencies (USB)

2851	5469	10045	17964
3004	5571	11288	21931
3443	6550	11306	
5451	8822	13312	

Offshore Drilling Support Aircraft

(USB)

2878	3019	3434
4672	5463	5508

Russian Aeroflot CW Communications

Aeroflot is the official airline of the Soviet Union. In flight between the USSR and Cuba, several Long Distance Operational Communications (LDOC) channels may be heard in USB (voice) as well as Morse code (CW). Frequently reported on CW are Havana (COL) and Moscow Kupavna Aero (RFNV).

6748		
8842	CW	
11193		
11312	CW	
11348	CW	(Commercial Flights)
15024	CW	
17936	CW	

All 74,000 series tail numbers belong to IL-18 aircraft; 76,000 series are TU-114; 86,000 series are IL-62; 11000 series are AN-12; and 42303 is a YAK-42.

VOLMET Aeronautical Weather Stations

A contraction of the French "flying weather," VOLMET stations broadcast recorded weather information on a fixed schedule to pilots. In nearly every case, the transmission mode is USB. Schedule times are shown as minutes past the hour.

VOLMET-Aviation Weather Forecasting Stations

PACIFIC REGION (PAC)

Frequencies

2863	10048
6679	13282
8828	

H+00 H+30
HONOLULU RADIO
Hickam AFB/Honolulu Intl
Gen Lyman Field/Hilo
Agana, Guam
Kahuli

H+05 H+35
HONOLULU RADIO
San Francisco
Los Angeles
Seattle/Tacoma
Portland
Sacramento Metro
Ontario
Las Vegas

H+25 H+55
HONOLULU RADIO
Anchorage
Fairbanks
Cold Bay
King Salmon
Sheyma
Anchorage
Vancouver

H+10 H+40
TOKYO RADIO
Tokyo-Narita Intl
Tokyo-Haneda Intl
Chitose
Nagoya
Osaka Intl
Fukuoka
Kimpo Intl (Korea)

H+15 H+45
HONG KONG RADIO
Kai Tak
Guang Zhou/Baiyan
Chiang Kai Shek Intl
Manila Intl
Naha
Kaohsiumg Intl
Mactan Intl
Hong Kong-Kai Tak

H+20 H+50
AUCKLAND VOLMET
Auckland
Christchurch
Wellington
Nandi
Noumean/La Tontouta
Pago Pago
Tahiti
Hong Kong-Kai Tak

H+25 H+55
ANCHORAGE
2863 6679 8828 13282

NORTH ATLANTIC REGION (NAT)

Frequencies
3485 6604 10051 13270

H+20 H+50
GANDER AERADIO

H+00 H+30
NEW YORK RADIO
Detroit
Chicago
Cleveland
Niagara Falls
Milwaukee
Indianapolis

H+15 H+45
NEW YORK RADIO
Bermuda
Miami

Nassau
Freeport
Tampa
West Palm Beach

H+05 H+35
NEW YORK RADIO
Bangor
Pittsburgh
Windsor Locks
St Louis
Syracuse
Minneapolis

H+10 H+40
NEW YORK RADIO
New York
Newark
Boston
Baltimore
Philadelphia
Washington DC

SHANNON AERADIO (EUR)

Frequencies
3413 5640 8957 13264

H+00 H+25 & H+30 H+55
SHANNON
Madrid
Prestwick
London-Heathrow
Amsterdam
Oslo
Copenhagen
Athens
Paris

EUROPE REGION (EUR)
(Tel Aviv/Praha)

Frequencies
2980(night) 5575 6580 8957
11391(day) 13264

H+05 H+35
BEN GURION RADIO
Tel Aviv/Ben Gurion
Haifa/Ramat David
Elat
Jerusalem
Larnaca
Athens
Ankara/Esenboga
Istambul/Yesilkoy

H+15 H+45
PRAGUE VOLMET
Prague
Bratislava
Brno
Wien
Munich
Frankfurt Main
Berlin
Warsaw
Moscow
Budapest

H+25 H+55
SOFIA, BULGARIA
(also GORKI, USSR)
11384

SOUTH AMERICAN REGION (SAM)

Frequencies
2881 5601 10087 13279

Lima	H+10 - H+40
Brasilia	H+15 - H+45
Buenos Aires	H+25 - H+55

Additional South American VOLMET

Antofagasta, Chile	H+20	3167.5 5280 7465.5
Asuncion Aeradio, Paraguay	(0905-2395) H+05	5601 10067
Brasilia Metro, Brazil		6603 10057 13352
Carrasco Aeradio, Montevideo, Uruguay	H+15	5803
Comodoro Rivadavia Aeradio, Argentina	H+30	4668 4675 8938
Cordoba Aeradio, Argentina	H+25	5475 8952
Ezeiza Aeradio, Buenos Aires, Argentina	H+15	2881 5601 11369
Galeao Metro, Rio de Janeiro, Argentina	H+00	10057
Puerto Montt	H+20	5280 (Sun 1020-2320; Wed 1120-2320)
Resistencia Aeradio, Argentina	H+50	4667 4675
Salta, Argentina	H+15	5475 5498
Tegucigalpa Aeradio, Honduras	H+50	(1200-2400) 4710

AFRICAN/INDIAN OCEAN REGION (AFI)

Frequencies
2860 3404 5499 6538 8852 10057

H+00 H+30
JOHANNESBURG
Bloemfontein
Jan Smuts
Kimberley
Pietersburg
Durban
Matsapu
Phalaborwia
Welkom
Nelspriut
Newcastle
Skukuza
0400-2100 or
3047 6716 9026

H+00 H+25
BRAZZAVILLE(Eng)
N'Djamena
Bangui
Libreville
San Tome
Mogadiscio

H+30 H+55
BRAZZAVILLE(Fr)
Kinshasa
Kano
Lagos
Luanda

H+05 H+35
NAIROBI
Lusaka
Ndola
Kogali
Bujumbura
Mogadiscio

H+10 H+40
NAIROBI
Entebbe
Dar es Salem
Mombasa
Kilimanjaro

H+09
JEDDAH, SAUDI ARABIA
6570 (0001-0330
10215 (0400-2030)

H+00 H+30
6617 10037
H+25 H+55
5499 10057
ANTANANARIVO
(0225-1930)
Ivato
Majunga
Tamatave
Mahebourg
St Denis
Diego Suarez
Moroni Comores

MIDDLE EAST REGION (MID)

Frequencies
3001 5561 8819

H+00 H+30
BAGHDAD RADIO
Baghdad Intl
Basrah/Magal

H+15 H+45
BEIRUT RADIO
Beirut Intl
Damascas Intl
Larnaca
Cairo Intl

H+05 H+35
TEHRAN RADIO
Tehran
Abadan
Tehran

H+20 H+50
CAIRO RADIO
Cairo
Damascus Intl
Beirut
Luxor

H+10 H+40
BAHRAIN RADIO
Bahrain
Dhahran
Kuwait

H+30
BASRAH RADIO (also 11336)
Basrah/Megal
Baghdad Intl

H+25 H+55
ISTANBUL RADIO
Istanbul
Yesilkoy

NORTH CENTRAL ASIA (NCA-USSR)

ENGLISH LANGUAGE
Frequencies
3461 4663 5676 10090 13279

Tashkent	H+05/H+35
Novosibirsk	H+10/H+40
Khabarovsk	H+15/H+45
Kiev	H+20/H+25
Moscow	H+25/H+55

RUSSIAN LANGUAGE
Network A
Frequencies
2941 3116 6617 8939 11297

Riga	H+00/H+30
Leningrad	H+05/H+35
Moscow	H+10/H+40
Kiev	H+20/H+50
Rostov	H+25/H+55

RUSSIAN LANGUAGE
Network B
Frequencies
3407 6730 8819 11279

Tbilisi	H+00/H+35
Aktyubinsk	H+05/H+35
Krasnodar	H+10/H+40
Alma Ata	H+15/H+45
Tashkent	H+20/H+50
Baku	H+25/H+55

RUSSIAN LANGUAGE
Network C
Frequencies
6693 8888 11318

Syktyvkar	H+00/H+30
Sverdlovsk	H+05/H+35
Novosibirsk	H+10/H+40
Kuybyshev	H+15/H+45
Tyuman	H+20/H+50

RUSSIAN LANGUAGE
Network D
Frequencies
5691 8852 13267

Kirensk	H+00/H+30
Yakutsk	H+10/H+40
Khabarovsk	H+15/H+45
Magadan	H+20/H+50
Irkutsk	H+25/H+55

RUSSIAN LANGUAGE
Network E
Frequency
8861

Pevek	H+10/H+40
Khatanga	H+15/H+45

Additional Russian VOLMET

4645	Tallin
4654	Moscow/Sheremetievo H+15/H+45
5536	Pechora H+25
6638	Novosibirsk
8990	Novosibirsk

SOUTHEAST ASIA REGION (SEA)

Frequencies (except Karachi)
2965 6676 11387

H+00 H+30
SYDNEY VOLMET
Sydney/Kingsford Smith
Brisbane
Melbourne
Adelaide
Alice Springs
Perth

H+05 H+35
CALCUTTA RADIO
Calcutta
Bombay
Delhi
Dhaka/Tezgaon
Mingaladon

H+20 H+50
SINGAPORE RADIO
Singapore/Changi
Singapore/Paya
Lebar
Kuala Lumpur
Jakarta
Brueni
Kota Kinabalu
Bali
Penang

H+10 H+40
BANGKOK
Bangkok Intl
Mingaladon
Tan son Nhut
Kuala Lumpur Intl
Singapore Changi/Paya
Lebar
U-Tapeo

H+00 H+30 H+55
BOMBAY
Colombo/Katunayake Intl
Madras
Karachi civil
Ahmadabad

H+15 H+45
KARACHI
(1500-0130) 3432
(0130-1500) 6680 10017
Karachi Civil
Nawabshah
Lahore

CARIBBEAN VOLMET NET (CAR)

Frequencies
2950 5580 11315

Port of Spain	H+05/H+35
Merida	H+10/H+40
Miami	H+25/H+55

Shannon Aeradio

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National Aeronautics and Space Administration (NASA)

Eastern Space and Missile Center (ESMC)

Cape Canaveral, Florida

Although the vast majority of NASA communications are conducted via satellite and wire line, some shortwave backup nets are still authorized. These become active during Space Shuttle missions. Frequencies recently monitored are underlined; they commonly link the Cape with Ascension Island and Antigua tracking stations. Voice and/or data may be transmitted on adjacent subchannels.

Most NASA HF communications are actually maintained by the U.S. Air Force because of air support during space flights.

Frequencies

2405	4704	5775	7697	9170
2505	4714	5810	7742	9910
2622	4755	5822	7765	10159
2664	4825	6720	7804	10215
2678	4856	6750	7833	10230
2716	4860	6753	7860	10270
2744	4900	6810	7910	10301
2764	4992	6880	7919	10305
2800	5060	6896	7985	10310
2836	5180	6837	8077	10327
3024	5187	6919	8993	10475
3120	5190	7313	9018	10780
3187	5235	7412	9022	10850
3365	5246	7461	9043	10880
4376	5350	7525	9115	10905
4500	5436	7605	9132	10949
4510	5680	7676	9138	11104
11252	13600	18022	20186	23940
11407	13676	18051	20192	24240
11414	13735	18196	20198	24512
11548	13742	18310	20266	24530
11621	13878	18331	20272	24780
11634	14497	18354	20390	24914
11984	14585	18434	20475	25130
11988	14615	18700	20690	25161
12107	14650	18769	21810	25198
12160	14896	18801	22683	25245
12277	14937	18990	22755	25597
12876	14967	19126	22990	26356
12287	15698	19143	23035	26389
13210	16216	19303	23281	26515
13227	16246	19371	23325	26684
13237	17470	19390	23413	27065
13244	17490	19640	23479	27720
13380	17554	19928	23485	
13468	17668	19963	23661	
13495	18009	19966	23840	

Western Space and Missile Center (WSMC)

USAF Pacific Missile Range

(Formerly SAMTEC)

Edwards AFB/Vandenberg AFB, CA

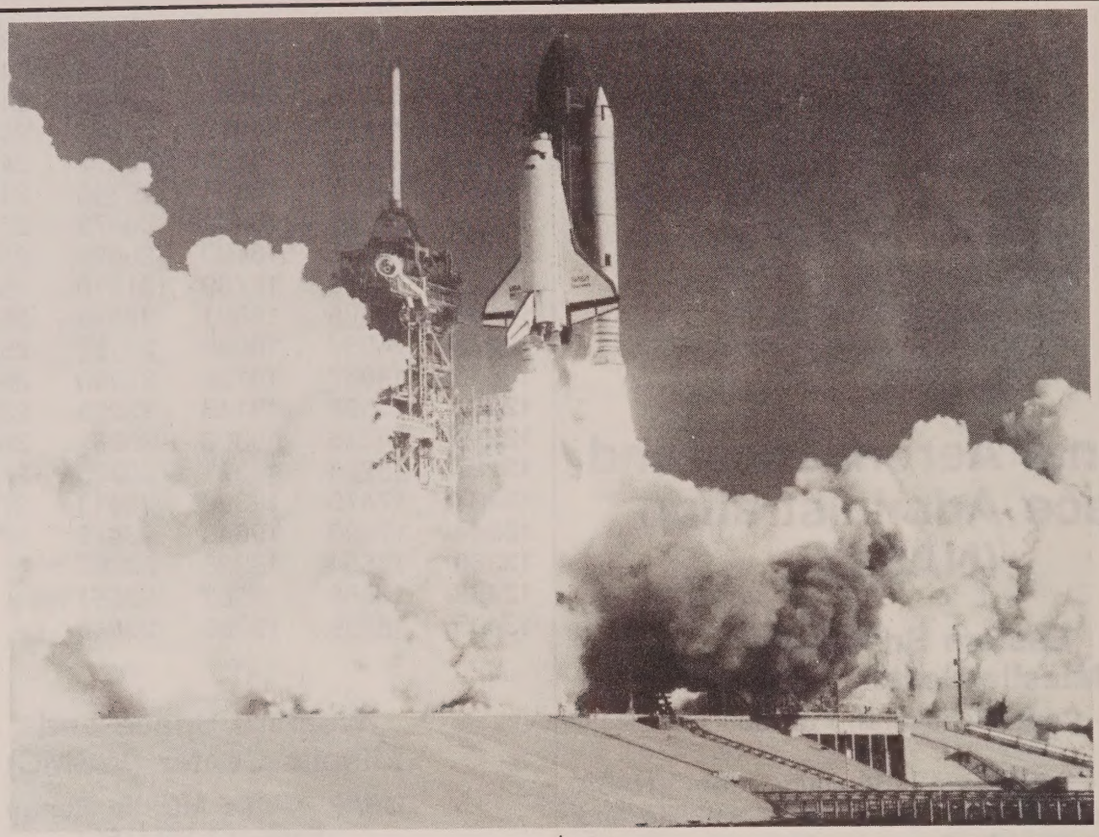
3162	6889	10510	15793 Air
4486	7705	10660	13900
4760	9029	10804	15021
5700 sec.	9212	11510	17428
5733	10272	13211	19303
5822	10352	13218 pri.	19640
6820		137556	20261
		14987	

(Primary frequencies underlined)

NASA Identifiers

Tactical Callsign	Identification
0	Patrick AFB, FL
1	Cape Canaveral, FL
3	Grand Bahama Is.
12	Ascension Is. (AFE 83)
28	Jupiter, FL
91	Antigua (AFE 86)
Abnormal One Zero	Vandenburg AFB, CA (AGD)
Abnormal Two Zero	Wheeler AFB, HI (AGD25)
Abnormal Four Zero	Kwajalein (ABK)

SPACE



ARIA (AGAR)	EC-135 Advanced Range Instrumentation Aircraft 4050th Test Wing, Wright Patterson AFB
Ashley 10	Vandenberg AFB, CA
Ashley 12	Wheeler AFB, HI
Canaveral Control	Port Canaveral Harbor Control (USN dockmaster)
Cape Leader	Contingency Emergency Base
Cape Radio	Cape Canaveral Communications (USAF)
Chase 1,2	T-38 Chase Aircraft
Dishpan	USS Redstone (Tracking Ship)
Eyesite	US Navy P-3 Orion Aircraft
Fisher	Cape Radio to Ships
Freedom	Booster Recovery Vessel (civilian contractor)
Gull Photo	USAF WC-130 Aircraft
Independence	Booster recovery vehicle (civilian contractor)
Jolly	USAF/ARRS SH-3 Helicopters
King	USAF/ARRS Aircraft
Liberty	Booster Recovery Vessel (civilian contractor)
Lovelorn	Contingency (USN) director
Peapod	USAF AC-130 aircraft
Thinker 1	Senior Range Operations Officer
Variety	Range safety officer

Additional NASA Frequency Allocations (kHz)

3380	Nationwide tracking net
3385	"
3395	"
6982.5	"
14455	"
2624	Houston, Texas

Russian Spacecraft

Freq.	Spacecraft	Mode
18000	Soyuz	AM Voice
18060	Soyuz/Salyut	
19542	Cosmos	
19954	Cosmos	RTTY/Data
19989	Cosmos	RTTY/Data
19994	Cosmos	RTTY/Data
20008	Cosmos/Salyut/Soyuz	CW/Data
29.357-29.403	RS10 (ham)	CW
29.403-29.453	RS11 (ham)	CW

Radiolocation Frequency Assignments

The 1610-1800 kHz band is filled with unusual sounds at night. Radio location frequency assignments include those used for survey and position fixing with equipment such as Raydist, Hydrotract, Cubic Argo and Decca Hi-Fix.

Recognizing 1610-1800 kHz signal patterns:

- Decca Hi-Fix (one short, three long dashes per second)
- Cubic Argo (2-4 second burst of uneven chirps)
- Central American Aeronautical beacons (2-3 letter CW)
- Fishing beacons (one letter, three numbers CW)

Raydist Assignments

(Average center frequencies shown)

Ch	Mobile	Interrogator
A	3288.5	1643.5-1644.9
B	3290.5	1644.5-1645.9
C	3294.5	1646.5-1647.9
D	3296.5	1647.5-1648.9
E	3300.5	1649.5-1650.9
F	3306.5	1652.5-1653.9

Additional Raydist Frequencies

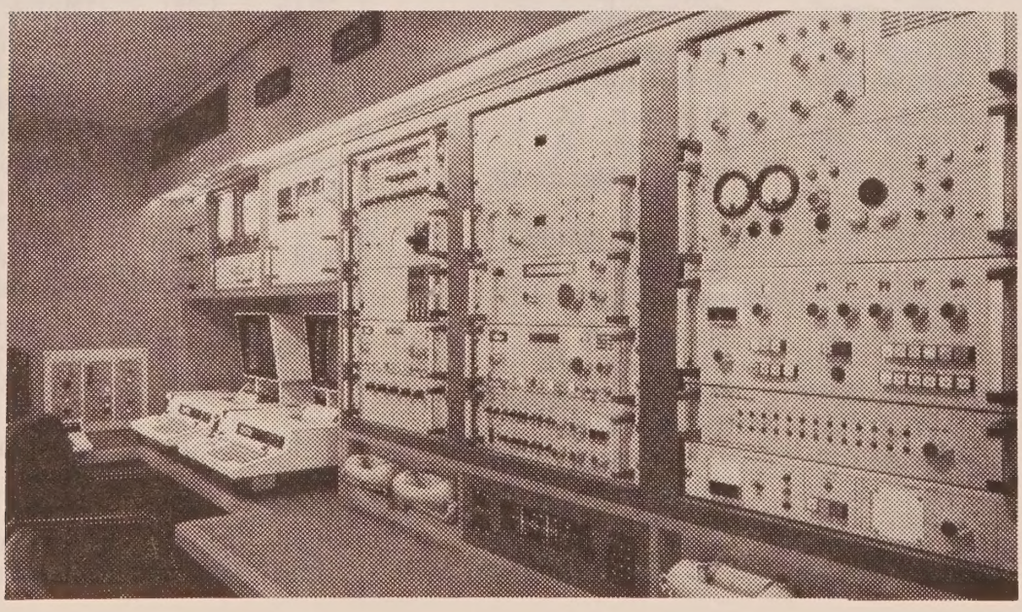
Mobile		Relay
3281	Alaska	1640.3
		1640.315/.725
		1648 Delaware Bay
3320.4	Coastline	1658.425
2398	USA except Alaska	1660.015
2456	Alaska and Great Lakes	
2510	USA except Alaska	
2848	Alaska	

Hydrotrac/Argo Radiolocation Assignments

Freq	Comment
1618.5/1798.5	For lane ID
1619.64/1799.6	For lane ID
1643	US Coastline
1649	US Coastline
1718.59	US Coastline

Argo Assignments

Frequency Pairs	
1643.0/1798.5	1643.7/1798.5
1649.0/1798.5	1644.7/1798.5
1653.0/1798.5	1646.7/1798.5
1648.0/1798.5	1647.7/1798.5
1643.0/1799.6	1649.7/1799.6
1649.0/1799.6	1652.7/1799.6
1653.0/1799.6	1658.4/1799.6
1648.0/1799.6	1660.0/1799.6



A well-equipped ship's radio room.

Canada

Cubic Argo

1610	1627	1644	1715.5	1762.5	1767.5
1628.5	1645	1716	1763	1769	
1616	1630	1646.7	1746.8	1764.5	1770
1618.6	1632	1648	1750	1764.8	1771
1620	1632.5	1673	1753	1765	1772
1622.9	1638.9	1674	1757	1765.6	1785
1624	1639	1705	1759	1766	1788
1626.9	1640	1714	1761.5	1766.5	

Limited Coastal Stations Nationwide

(Private correspondence for business and shipping; see following pages for frequencies)

Callsign	Location
KBQ	Miami, FL
KCQ	Galveston, TX
KDL	Houston, TX
KED	New Orleans, LA
KJG	New Orleans, LA
KKP	Seattle, WA
KKV	Piney Point, MD
KLB	Houston, TX
KMB	Houston, TX
KNB 304	Morgan City,LA
KEH	Houma, LA
KDR	St Louis, MO
KEC	New Orleans, LA
KFC	Morgan City, LA
KFN 540	Pt Arthur, TX
KHT	Cedar Rapids, IA
KFV	Palm Beach, FL
KHU	San Diego, CA
KRM	Pt Arthur, TX
KSW	Oakland, CA
KUR	Pt Arthur, TX
KUY	Pt Arthur, TX
KWU	Golden Meadows, LA
KXQ	Houston, TX
KXE	Des Allemands, LA
KYZ	Galveston, TX
KZN	Miami, FL
KZU	Harvey, LA
WBK	Pittsburgh, PA
WBQ	Bowling Green, KY
WDJ	Morgan City, LA
WDM	New Orleans, LA
WEC	Norfolk, VA
WFE	Houston, TX
WFX 605	Atlantic City, NJ
WGK	San Juan, PR
WIX	Lakin, WV
WJD	Tampa, FL
WJK	Jacksonville, FL
WJL	Narragansett, RI
WJU	Dravoburg, PA
WKC	St Petersburg, FL
WLN	San Juan, PR
WMP	W Palm Beach, FL
WNT	Greenville, MS
WPE	Jacksonville, FL
WRK	Morgan City, LA
WWB	St Louis, MO

Alaska

	Call	Coast	Ship
Ft.Nelson		5222.5	5009.0
		4792.5	5375.0
Hay River		5396.0	5856.0
Cold Bay	WGG53	2312.0	2134.0
Cordova	WDU26	2397.0	2237.0
Juneau	WGG58	2400.0	2240.0
Ketchikan	WGG56	2397.0	2237.0
Kodiak	WDU23	2309.0	2131.0
Nome	WGG55	2400.0	2240.0
Sitka	WDU29	2312.0	2134.0

Radio Beacons

1600-1800 kHz

kHz	ID	Location
1600	NHG	Palmer Station, Antarctica
1602	LML	Lomalinda, Colombia
1610	TDA	Trinidad, Colombia
1613	RAB	Rabinal, Guatemala
1615	MIL	Quincemil, Peru
1615	NZ	Nadzab, Papua New Guinea
1615	OR	Ohura, New Zealand
1620	CEP	Concepcion, Bolivia
1623	FAM	Fazenda Amalia, Brazil
1623	GNY	Gurney,Papua New Guinea
1623	HUM	Humaita, Brazil
1623	PP	Oriximina, Brazil
1625	PAT	Pastaza, Ecuador
1627	NPA	Novo Paraiso, Brazil
1627	SAC	Sao Carlos, Brazil
1630	TM	Taumarunui, New Zealand
1632	OKT	Tabubil, Papua New Guinea
1635	LMC	Limoncocha, Ecuador
1635	ORI	Orito, Colombia
1638	URC	Urcos, Peru
1640	SJV	San Javier, Bolivia
1645	YPI	Yaupi, Ecuador
1650	SOT	Reyes, Bolivia
1655	RIO	Riobamba, Ecuador
1662	KUB	Kubuna, Papua New Guinea

1665	CBR	Cabo Norte, Brazil
1670	FU	Auckland, New Zealand
1670	PAH	Prainha, Brazil
1670	TIPM	Palmar Sur, Costa Rica
1675	TSL	Tsile Tsile, Papua New Guinea
1682	QQ	Canoas, Brazil
1685	MAC	Macara, Ecuador
1685	MER	Mercaderes, Colombia
1689	MH	Mt Hagen, Papua New Guinea
1692	KIU	Kiunga, Papua New Guinea
1700	MAS	Macas, Ecuador
1715	BAN	Banos, Ecuador
1715	PP	Vitoria, Brazil
1745	CAN	Canar, Ecuador

(Many of these are moving to the 200-400 kHz band)

Ship to Shore CW

Public Correspondence Stations
(TELEX)

WCC Chatham, MA

4238 4268 4331 6333.5 6337 6376 8586 8630 12926.5 12961.5 13033.5 16933.2 16972 16973.45 22347.5 22348.5 22366.5 22518 22521

KPH San Francisco, CA

4247 6477.5 8618 8642 12808.5 13002 17016.5 17016.8 22479 22557

WOE Lantana, FL

4292 6411.35 8486 12970.5 17160.8 22503

WMH Baltimore, MD

2063 4346 6333.5 6351.5 8610 8686 12952.5 12952.9 17093.6

WPD Tampa, FL

4274 6365.5 8615.5 13051.5 17170.4

KLC Galveston, TX

4256 6369 8508 8666 13038 16871.3 22467

WNU Slidell, LA

4294 4310 6326.5 6389.65 8525 8570 12826.5 13011 16861.7 17117.6 22431 22458

WSL Amagansett, NY

4342.65 6414.5 6416 8514 8658 12660 12997.5 13024.9 16997.6 17021.6 22485 22487

Marine Telex and Press

WCC Chatham, MA

Coast	Ship
4356.5	4177
6504.5	6266.5
8715	8354
13081.5	12501.5
17207.5	16670.5
22571.5	22202.5

KPH San Francisco, CA

Coast	Ship
4356	4176.5
6500.5	6262.5
8711	8350
13077.5	12497.5
17203.5	16666.5
22567.5	22198.5

KFS Palo Alto, CA

Frequencies	
2037.5	8558.4
2061.5	12695.5
4228	12844.5
4274	17026
6348	17184.8
6365.5	22425
8444.5	22515
8445	

WOM Ft. Lauderdale, FL

Coast	Ship
4538	4048
4535	4015
4532	4057
4529	4051
7398	7980.5
7395	7977.5
7392.2	7974.5

Scheveningen, Netherlands

Callsign	Coast	Ship
PCH52	4351.5	4172.0
PCH95	4250.0	4178.0
PCH53	6496.5	6258.5
PCH96	6404.0	6268.5
PCH4	8654.4	8298.1
PCH54	8713.0	8352.0
PCH5	12768.0	12521.5
PCH55	13077.0	12497.0
PCH92	17007.2	16698.0
PCH56	17217.5	16680.5
PCH98	22324.5	22226.0
CH H	1919.5	1972.5

Medium Frequency Coastal Stations
(2 MHz)

NOTE: Many coastal stations are abandoning their 2 MHz services. The following list is an example of this transition and many frequencies are now inactive.

Callsign/Location	Coast	Ship
KOW Seattle, WA	2522	2126
KFX Astoria, OR	2442	2009
	2598	2206
KTJ Coos Bay, OR	2566	2031.5
KOE Eureka, CA	2506	2406
	2450	2366
KLH San Fran, CA	2506	2406
	2450	2003
KOU San Pedro, CA	2566	2009
	2598	2206
	2522	2126
	2466	2382
KBP Kahuku, Hawaii	2530	2134
KMV Agana, Guam	2506	2009
WOU Boston, MA	2506	2406
	2450	2366
	2566	2390
WOX New York, NY	2590	2198

	2522	2126
	2482	2382
WOO Ocean Gate,NJ	2558	2166
WAE Pt Harbor,NC/	2538	2142
WGB Norfolk,VA	2450	2366
WJO Charleston, SC	2566	2390
WNJ Jacksonvlle,FL	2566	2390
WFA Tampa, FL	2550	2158
	2466	2009
WDR Miami, FL	2514	2118
	2490	2031.5
	2442	2406
WLO Mobile, AL	2572	2430
WAK New Orleans,LA	2598	2206
	2482	2382
WLF Wilmington, DE	2558	2166
KGN Delcambre, TX	2506	2458
KQP Galveston, TX	2530	2134
	2450	2366
KCC Corpus Christi, TX	2538	2142
WCT San Juan, PR	2530	2134
WAH St Thomas, VI	2506	2009

Alaska

Callsign/Location	Coast	Ship
WGG53 Cold Bay	2312	2134
WDU26 Cordova	2397	2237
WGG58 Juneau	2400	2240
WGG56 Ketchikan	2397	2237
WDU23 Kodiak	2309	2131
WGG55 Nome	2400	2240
WDU29 Sitka	2312	2134

Great Lakes

Callsign/Location	Coast	Ship
WBL Buffalo, NY	2514.0	2118.0
	2550.0	2158.0
	2582.0	2206.0
	4415.8	4415.8
	4428.6	4428.6
	8783.2	8783.2
WMI Lorain, OH	4369.8	4369.8
	8796.4	8796.4
WLC Rogers City,MI	2514.0	2118.0
	2550.0	2158.0
	2582.0	2206.0
	4369.8	4075.4

Additional Public Paired Channels

Coast	Ship
2582	2206
4072.4	4072.4
4371	4371
4415.8	4117.2
4419	4120.4
4428.6	4130
6147.5	6147.5
6455	6455
8210.8	8210.8
8793.2	8249.2

2 MHZ Simplex

Freq	Use	Area
2003	Intership Safety	Great Lakes
2082.5	Intership Safety	All Areas
2142	Intership Safety	Pacific coast daytime
2203	Intership Safety	Gulf of Mexico
2638	Intership Safety	All Areas
2670	U.S.C.G. only	All Areas
2738	Intership Safety	All Areas except Great Lakes and Gulf of Mexico
2782	Intership Safety	All Areas
2830	Intership Safety	Gulf of Mexico

WOM Norwegian Steam Lines (USB)

Coast	Ship
4529.0	4051.0
4532.0	4057.0
4535.0	4015.0
4538.0	4048.0
7392.2	7974.5
7395.0	7977.5
7398.0	7980.5

Mississippi Valley Simplex

Callsign/Location	Frequencies
WCM Cincinnati	2086.0 2782.0 4063.0 6515.7 8213.6 12333.1 16518.9
WFN Jeffersonville/ Louisville	2086.0 2782.0 4115.7 6518.8 8725.1 13103.9 17291.8
WJG Memphis	2086.0 2782.0 4087.8 6209.3 8201.2 12333.1 16518.9
WGK St Louis	2086.0 2782.0 4410.1 6212.4 8737.5 13109.9 17291.8

Radio room aboard the M.S. Southward

Ship to Shore Worldwide Duplex Voice

"High Seas" - (USB)

The following frequency band plan has been adopted internationally to standardize frequency pairs used by ship and coastal radiotelephone stations.

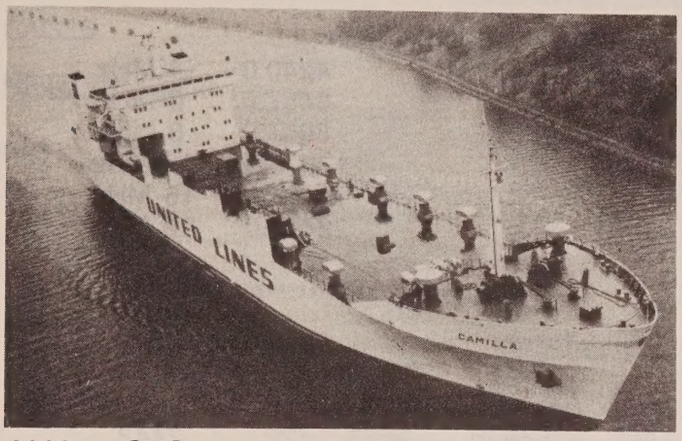
Number/letter channel designators (4A through 22E) indicate simplex and are used by limited coastal stations and ships for private correspondence.

A superscript following a channel number (i.e., 401[1]) refers to the table of transmission times which follows this list.

Channel#	Common User	Coast Freq	Ship Freq	USCG Use
401[1]	KMI/WAH	4357.4	4063.0	
402		4360.5	4066.1	
403[3]	WOM	4363.6	4069.2	
404		4366.7	4072.3	
405	PCH	4369.8	4075.4	
406	GKC	4372.9	4078.5	
407		4376.0	4081.6	ALL
408	NOAA	4379.1	4084.7	
409		4382.2	4087.8	
410[7]	WOO	4385.3	4090.9	
411[8]	WOO	4388.4	4094.0	
412[4]	WOM	4391.5	4097.1	
413		4394.6	4100.2	
414	DAN	4397.7	4103.3	
415		4400.8	4106.4	ALL
416[2]	KMI/WA	4403.9	4109.5	
416[9]	WOO			
417[5]	WOM/KMI	4407.0	4112.6	
418	OXZ	4410.1	4115.7	
419	WLO	4413.2	4118.8	
420	SAG	4416.3	4121.9	
421		4419.4	4125.0	
4A			4125.0	
4C			4419.4	
422[10]	WOO	4422.5	4128.1	
423[6]	WOM	4425.6	4131.2	
424	*2	4428.7	4134.3	ALL
425	OST,OXZ	4431.8	4137.4	
425	NOAA	4434.9	4140.5	
427	(4B)		4143.6	
601	DAN	6506.4	6200.0	ALL
602	OST,NOAA	6509.5	6203.1	
603		6512.6	6206.2	A,G,R
604	LPL,WAH	6515.7	6209.3	
605	WAH	6518.8	6212.4	ALL
606	(6C)	6521.9	6215.5	
607	(6A)		6218.6	
608	(6B)		6221.6	
801	SAG	8718.9	8195.0	ALL-C/G
802[3]	WOM	8722.0	8198.1	
803	SAG	8725.1	8201.2	
804[1]	KMI/WAH	8728.2	8204.3	
805[4]	WOM	8731.3	8207.4	
806	PCH	8734.4	8210.5	
807	Vancouvr	8737.5	8213.6	
808[9]	WOO	8740.6	8216.7	
809[2]	KMI	8743.7	8219.8	
810[4]	WOM	8746.8	8222.9	
811[10]	WOO	8749.9	8226.0	
812	NOAA	8753.0	8229.1	
813	OST	8756.1	8232.2	
814	WOM	8759.2	8235.3	
815[8]	WOO	8762.3	8238.4	
816	GKC	8765.4	8241.5	ALL
817	DAN	8768.5	8244.6	A,G,R

MARITIME

818	OXZ	8771.6	8247.7	
819		8774.7	8250.8	ALL-C/G
820		8777.8	8253.9	
821		8780.9	8257.0	
822[1]	KMI	8784.0	8260.1	
823		8787.1	8263.2	
824	WLO	8790.2	8266.3	
825[6]	WOM	8793.3	8269.4	
826[7]	WOO	8796.4	8272.5	
827		8799.5	8275.6	
828	*1,NOAA	8802.6	8278.7	
829		8805.7	8281.8	
830	WLO	8808.8	8284.9	
831	WOM	8811.9	8288.0	
832	(8A)		8291.1	
833	(8B)		8294.2	
1201[1]	KMI	13100.8	12330.0	
1202[2]	KMI	13103.9	12333.1	
1203[2]	KMI	13107.0	12336.2	
1203[10]	WOO			
1204	WOO	13110.1	12339.3	
1205		13113.2	12342.4	ALL
1206[3]	WOM	13116.3	12345.5	
1207	PCH	13119.4	12348.6	
1208[4]	WOM	13122.5	12351.7	
1209[5]	WOM/ZSO	13125.6	12354.8	
1210[7]	WOO	13128.7	12357.9	
1211[8]	WOO	13131.8	12361.0	
1212	WLO	13134.9	12364.1	
1213	PCH,8PO	13138	12367.2	
1214	OXZ,NOAA	13141.1	12370.3	
1215[6]	WOM	13144.2	12373.4	
1216		13147.3	12376.5	
1217		13150.4	12379.6	ALL
1218		13153.5	12382.7	
1219	PCH,NOAA	13156.6	12385.8	A,G,R
1220		13159.7	12388.9	
1221		13162.8	12392.0	
1222	*1	13165.9	12395.1	
1223	WOM	13169.0	12398.2	
1224	DAN	13172.1	12401.3	
1225	LGQ	13175.2	12404.4	
1226	WLO*1	13178.3	12407.5	
1227		13181.4	12410.6	
1228[9]	WOO	13184.5	12413.7	
1229[1]	KMI	13187.6	12416.8	
1230	WOM	13190.7	12419.9	
1231	*1	13193.8	12423.0	
1232	*2	13196.9	12426.1	ALL-C/G
1233	(12A)		12429.2	
1234	(12B)		12432.3	
1235	(12C)		12435.4	
1601[3]	WOM	17232.9	16460	
1602[1]	KMI/WAH	17236.0	16463.1	
1603[2]	KMI/WAH	17239.1	16466.2	
1604		17242.2	16469.3	
1605[8]	WOO*2	17245.3	16472.4	
1606	IAR	17248.4	16475.5	A,G,R
1607		17251.5	16478.6	
1608	ZSO	17254.6	16481.7	
1609[4]	WOM	17257.7	16484.8	
1610[5]	WOM	17260.8	16487.9	
1611[6]	WOM,GKC	17263.9	16491.0	
1612	NOAA	17267.0	16494.1	
1613	NOAA	17270.1	16497.2	ALL
1614		17273.2	16500.3	
1615	GKC	17276.3	16503.4	
1616	WOM	17279.4	16506.5	
1617	OXZ	17282.5	16509.6	
1618	OXZ	17285.6	16512.7	
1619	*1	17288.7	16515.8	
1620[9]	WOO	17291.8	16518.9	
1621		17294.9	16522.0	
1622	*1	17298.0	16525.1	
1623	PCH	17301.1	16528.2	
1624	KMI	17304.2	16531.3	
1625		17307.3	16534.4	ALL
1626[10]	WOO	17310.4	16537.5	
1627		17313.5	16540.6	
1628	*1	17316.6	16543.7	
1629		17319.7	16546.8	
1630		17322.8	16549.9	
1631[7]	WOO	17325.9	16553.0	
1632		17329.0	16556.1	
1633	GKC	17332.1	16559.2	
1634		17335.2	16562.3	
1635	OXZ	17338.3	16565.4	
1636	PCH	17341.4	16568.5	
1637	GKC	17344.5	16571.6	
1638		17347.6	16574.7	ALL-C/G
1639	PCH	17350.7	16577.8	
1640	*2	17353.8	16580.9	
1641	WLO	17356.9	16584.0	
1642	(16A)		16587.1	
1643	(16B)		16590.2	
1644	(16C)		16593.3	
2201[9]	WOO	22596.0	22000.0	
2202	IAR	22599.1	22003.1	
2203	SAG	22602.2	22006.2	
2204	*1	22605.3	22009.3	
2205[7]	WOO	22608.4	22012.4	
2206	GKC	22611.5	22015.5	ALL
2207	DAN	22614.6	22018.6	
2208		22617.7	22021.7	
2209		22620.8	22024.8	
2209		22620.8	22024.8	
2210[8]	WOO	22623.9	22027.9	
2211		22627.0	22031.0	
2212		22630.1	22034.1	
2213		22633.2	22037.2	
2214[2]	KMI	22636.3	22040.3	
2215[3]	WOM	22639.4	22043.4	
2216[4]	WOM	22642.5	22046.5	
2217	*2	22645.6	22049.6	
2218	OXZ	22648.7	22052.7	ALL
2219		22651.8	22044.8	



2220	GKC	22654.9	22058.9
2221		22658.0	22062.0
2222	WOM	22661.1	22065.1
2223	KMI/WAH	22664.2	22068.2
2224		22667.3	22071.3
2225		22670.4	22074.4
2226		22673.5	22077.5
2227		22676.6	22080.6
2228	KMI	22679.7	22083.7
2229		22682.8	22086.8
2230	SAG	22685.9	22089.9
2231	GKC	22689.0	22093.0
2232	PCH	22692.1	22096.1
2233	NOAA	22695.2	22099.2
2234		22698.3	22102.3
2235	NOAA	22701.4	22105.4
2236	KMI	22704.5	22108.5
2236[10]	WOO		
2237		22707.6	22111.6
2238		22710.7	22114.7
2239		22713.8	22117.8
2240		22716.9	22120.9
2241	(22A)		22124
2242	(22B)		22127.1
2243	(22C)		22130.2
2244	(22D)		22133.3
2245	(22E)		22136.4

*1-(FFL/FFS/FFT) St. Lys Radio, France
*2-(SVA/SVB/SVN) Athens Radio, Greece

USCG Key

ALL = All stations use
A = NMA Miami
F = NMF Boston
G = NMG New Orleans
N = NMN Portsmouth
R = NMR San Juan
ALL-C/G= All except Caribbean & Gulf of Mexico

User Locations:

DAN Nordeich, Fed Rep Germany
GKC Portishead Radio, England
IAR Rome, Italy
KMI Pt Reyes, CA
LGQ Rogaland, Norway
LPL Gen Pac Radio, Buenos Aires,ARG
OST Oostende, Belgium
OXZ Lyngby, Denmark
PCH Scheveningen, Netherlands
SAG Goteborg, Sweden
WAH St. Thomas, Virgin Islands
WOM Ft Lauderdale, FL
WOO Manahawkin (NY) New Jersey
WLO Mobile, AL
ZSO Capetown Radio, S. Africa
8PO Bridgetown, Barbados

Transmission Times

(1) **KMI**
0000 TRFC/WX
0300 TRFC
0600 TRFC/WX
0900 TRFC
1200 TRFC
1500 TRFC/WX
1800 TRFC
2100 TRFC

(2) **KMI**
0100 TRFC
0400 TRFC
0700 TRFC
1000 TRFC
1300 TRFC/WX
1600 TRFC
1900 TRFC/WX
2200 TRFC

(3) **WOM**
0030 TRFC
0430 TRFC
0830 TRFC
1230 TRFC/WX
1630 TRFC
2030 TRFC

(4) **WOM**
0130 TRFC
0530 TRFC
0930 TRFC
1330 TRFC/WX
1730 TRFC
2130 TRFC

(5) **WOM**
0230 TRFC
0630 TRFC
1030 TRFC
1430 TRFC
1830 TRFC
2230 TRFC/WX

(6) **WOM**
0330 TRFC
0730 TRFC
1130 TRFC
1530 TRFC
1930 TRFC
2330 TRFC/WX

(7) **WOO**
0000 TRFC
0400 TRFC
0800 TRFC
1200 TRFC/WX
1600 TRFC
2000 TRFC/WX

(8) **WOO**
0100 TRFC
0500 TRFC
0900 TRFC
1300 TRFC/WX
1700 TRFC
2100 TRFC/WX

(9) WOO		(10) WOO	
0200	TRFC	0300	TRFC
0600	TRFC	0700	TRFC
1000	TRFC	1100	TRFC
1400	TRFC/WX	1500	TRFC/WX WX
1800	TRFC	1900	TRFC
2200	TRFC WX	2300	TRFC/WX

Automated Mutual Assistance Vessel Rescue

(AMVER) System

Worldwide Ship to Shore Channels (USB)

In order to ensure safety on the high seas, coastal stations around the globe maintain a constant radio watch on guarded channels to assist vessels in distress.

In addition to the channels listed, all stations (except U.S. Coast Guard NMF, NMN, NMA and NMR) monitor the international distress and calling frequency 2182 kHz. This frequency is usually the calling channel when no ship frequency is shown in the list.

Atlantic Communications

Western North Atlantic

Call/Location		Coast	Ship
CANADA			
(See listings under Canadian section, Canadian Coast Guard)			
UNITED STATES			
NMA	Miami, FL	6506.4	6200.0
NMF	Boston,MA	6506.4	6200.0
NMG	New Orleans, LA	4428.7	4134.3
		6506.4	6200.0
		8765.4	8241.5
		13113.2	12342.4
NMN	Portsmouth, VA	8465.0	8 MHz
		12718.5	12 MHz
		16976.0	16 MHz
		4428.7	4134.3
		6506.4	6200.0
		8765.4	8241.5
		13113.2	12342.4
BERMUDA			
ZBM	St George	2582	2182
PANAMA			
HPN60		4240.0	4 MHz
		6467.0	6 MHz
		8607.0	8 MHz
		12873.5	12 MHz
		17128.5	16 MHz
		22412.0	22 MHz

Eastern North Atlantic

Call/Location		Coast	Ship
NORWAY			
LGA	Alesund	1722	2442
LGN	Bergen	1743	2463
LGP	Bodo	2656	2139
LGZ	Farsund	1750	2470
LGL	Floro	2649	2132
LGI	Hammerfest	1722	2442
LGH	Harstad	1736	2456
LFO	Orlandet	2635	2118
LGQ	Rogaland	1729	2449
LFW		4325.0	4 MHz
			4185
LGU		6432.0	6 MHz
			6467
			6277.5
LFU		6467.0	6 MHz
LFN		8527.5	8 MHz
LGB		8574.0	8 MHz
			8370
LFB		8678.0	8 MHz
			8678
LGJ		12727.5	12 MHz
LFJ		12876.0	12 MHz
			12555
LFI		12961.5	12 MHz
LFT		16952.4	16 MHz
LGX		17074.4	16 MHz
			16740
LFF		17165.6	16 MHz
LGG		22425.0	22 MHz
LFG		22473.0	22 MHz
			22242
LGT	Tjome	1736	2456
LGE	Tromso	1750	2470
LGV	Vardo	1729	2449
		2182	
SWEDEN			
SAG2	Gothenburg	4262.0	4 MHz
SAG3		6372.5	6 MHz
SAG4		8498.0	8 MHz
SAB4		8646.0	8 MHz
SAG6		12880.5	12 MHz
SAB6		12755.5	12 MHz
SAG8		17079.4	16 MHz
SAG9		22413.0	22 MHz

SAG25		25461.0	25 MHz
NETHERLANDS			
		1764	2030
PCH	Scheveningen	2824	2520
		4369.8	4075.4
		4419.4	4125
		6509.5	6203.1
		6521.9	6215.5
		8780.9	8257
		13162.8	12392
		17294.9	16522
		22658.0	22062
		6406	4 MHz
		12966	12 MHz
PCH20		4250.0	4 MHz
PCH40		8562.0	8 MHz
PCH41		8622.0	8 MHz
PCH42		8654.4	8 MHz
PCH50		12768.0	12 MHz
PCH51		12799.5	12 MHz
PCH52		12853.5	12 MHz
PCH60		16902.0	16 MHz
PCH61		17007.2	16 MHz
PCH62		17104.2	16 MHz
PCH70		22324.5	22 MHz
PCH71		22539.0	22 MHz
PCG41		8796.4	8272.5
PCG51		13138.0	12367.2
PCG61		17341.4	16568.5
PCG71		22608.4	22012.4
IRELAND			
EJM	Malin Head	1841	2182
EJK	Valentia Is	1827	2182
SPAIN			
EAC	Cadiz	4275.5	4 MHz
		6505.5	6 MHz
		8726	8 MHz
		13056	12 MHz
		17175.2	16 MHz
		22384	22 MHz
EAD	Aranjuez	4349	4 MHz
EAD2		6382.22	6 MHz
EAD3		8682	8 MHz
EAD44		12887.5	12 MHz
EAD4		13065	12 MHz
EAD5		17184.8	16 MHz
EAD6		22446	22 MHz
EAF	Vigo	6498.5	6 MHz
		8473	8 MHz
		13092	12 MHz
		17280.8	16 MHz
EAT	Santa Cruz de Tenerife	6498.5	6 MHz
		8473	8 MHz
		13092	12 MHz
		6942.8	16 MHz
EDZ		4269	4 MHz
EDZ2		6400.5	6 MHz
EDZ4		8618	8 MHz
EDZ5		12934.5	12 MHz
EDZ6		17064.8	16 MHz
EDZ7		22533	22 MHz
GREAT BRITAIN			
	(Consult ITU listings for frequencies)		
GKA	Portishead		
GKR	Wick (Scotland)		
GND	Stonehaven (Scotland)		
GCC	Cullercoats		
GKZ	Humber		
GNF	Northforeland		
GNI	Niton		
GLD	Lands End		
GIL	Ilfracombe		
GLV	Anglesey		
GPK	Portpatrick (Scotland)		
GHD	Hebrides		

South Atlantic

Call/Location	Coast	Ship
ARGENTINA		
LPD68 Gen.Pacheco	4268.0	4 MHz
LPD86	8646.0	8 MHz
LPD88	12988.5	12 MHz
LPD46	17045.6	16 MHz
	18081.5	
LPD91	22419.0	22 MHz
	20520	
LOL	17665	
LPL	17285.7	
LPL5	17232.9	
SOUTH AFRICA		
ZSJ2 Navcomcen Capetown	4145	4 MHz
	4283	4 MHz
ZSJ3	6386.5	6 MHz
ZSJ4	8566.0	8 MHz
ZSJ5	12849.0	12 MHz
ZSJ6	17132.0	16 MHz

Pacific Communications

Eastern Pacific

Call/Location	Coast	Ship
CANADA		
(See listings under Canadian Coast Guard)		

MARITIME

UNITED STATES			
NOJ	Kodiak, AK	2670	2182
		6506.4	6200.0
NMC	San Francisco CA	2670	2182
		6383.0	6 MHz
		8574.0	8 MHz
		16800.9	16 MHz
		4428.7	4134.3
		6506	6200
		8765.4	8241.5
		13113.2	12342.4
NMO	Honolulu,HI	2670	2182
		8650.0	8 MHz
		12899.5	12 MHz
		22476.0	22 MHz
		4428.7	4134.3
		6506.4	6200.0
		8675.4	8241.5
KUQ	Pago Pago, Am Samoa	5475	4 MHz
		6361.0	6 MHz
		8585.0	8 MHz
		12871.5	12 MHz
PANAMA			
HPN60	Canal Radio	4240.0	4 MHz
		6467.0	6 MHz
		8607.0	8 MHz
		12873.5	12 MHz
		17128.5	16 MHz
		22412.0	22 MHz
CHILE			
CBV	Valparaiso	4349.0	4 MHz
		8478.0	8 MHz
		12714.0	12 MHz
		16945.0	16 MHz
		22473.0	22 MHz
ECUADOR			
HCG	Guayaquil	8476	8 MHz
		12711	12 MHz
		16948	16 MHz
FRENCH POLYNESIA			
FJA	Mahina Tahiti	2620	2182
		8674	8230
		8805.7	8281.8
FIJI			
3DP	Suva	2111	2182
		6215.5	6215.5
		8690.0	8 MHz
		12700.0	12 MHz

AUSTRALIA			
VIS	Sydney	2201	2182
		4428.7	4125.0
VIS53		4245.0	4 MHz
		6512.6	6215.5
VIS3		6464.0	6 MHz
VIS5		12952.5	12 MHz
		12979.5	
VIS6		17161.3	16 MHz
		17194.4	
VIS26		8421.0	8 MHz
		8452.0	
VIS42		22474.0	22 MHz
VIP	Perth	2201	2182
VIP		4428.7	4125.0
		6512.6	6215.5
VIP3		8597.0	8 MHz
VIP4		12994.0	12 MHz
VIP5		16947.6	16 MHz
VIP6		22315.5	22 MHz
VIP7		4229.0	4 MHz
VIO	Broome	2201	2182
		6407.5	6 MHz
		4428.7	4125.0
		6512.6	6215.5
VIC	Carnarvon	2201	2182
		6407.5	6 MHz
		4428.7	4125.0
		6512.6	6215.5
VID	Darwin	2201	2182
		6463.5	8 MHz
		4428.7	4125.0
		6512.6	6215.5
VIR	Rockhampton	2201	2182
		4255.6	4 MHz
		4428.7	4125.0
		6512.6	6215.5
VII	Thursday Is	2201	2182
		6333.5	8 MHz
		4428.7	4125.0
		6512.6	6215.5
VIT	Townsville	2201	2182
		6463.5	8 MHz
		4428.7	4125.0
		6512.6	6215.5
Emergency/Calling			2524
			2182
Customs			7160
NEW ZEALAND			
ZLD	Auckland	2207	2182
		4143.6	4125
		6218.6	6215.5
ZLB	Awarua	2423	2182
		4143.6	4125
ZLB2		4277.0	4 MHz
ZLB3		6393.5	6 MHz

ZLB4		8504.0	8 MHz
ZLB5		12740.0	12 MHz
ZLB6		17170.4	16 MHz
ZLB7		22533.0	22 MHz
ZLW	Wellington	2153	2182
		4143.6	4125
ZLC	Chatham Is	2104	2182

Western Pacific

Call/Location		Coast	Ship
UNITED STATES			
NRV	Guam	2670	2182
		8570.0	8 MHz
		12743.0	12 MHz
		17146.4	16 MHz
		22567.0	22 MHz
		6200.0	
		6506.4	
		12342.4	
		13113.2	
PHILLIPINES			
DZG	Las Pinas	6441.0	6 MHz
		8632.0	8 MHz
		12948.0	12 MHz
		17176.0	16 MHz
		22502.0	22 MHz

CANADA

Limited Coastal Stations

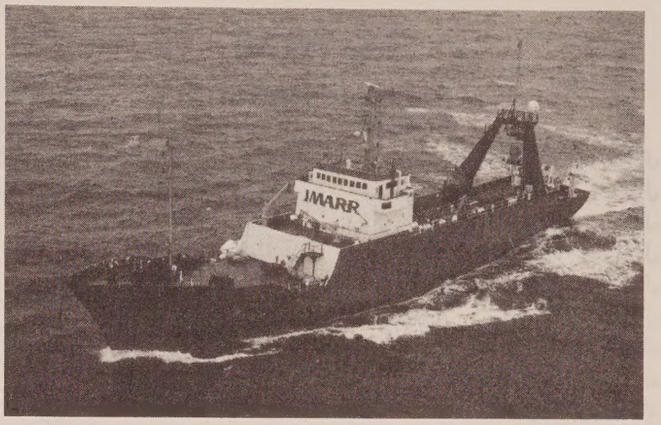
	T	R
Halifax, N.S.		
	4133.2	4431.8
	8236.4	8770.4
	12375.5	13154.5
	16505.5	17300.5
Inuvik, NWT		
	2220	2484
Kenora, Ont.		
USB Phone Patch		
	4666	4565
	7546	7400
Val d'Or, Que.		
USB Phone Patch		
	4971.1	4766.5
	7326.5	7461.5

Netherlands Antilles

Curacao Radio, USB

T	R
2158.0	2550.0
4110.8	4409.4
8236.4	8770.4
12375.5	13154.5
16505.5	17300.5

Emergency/
Calling 2182.0 2524.0
Customs 7160.0



The R.V. Farnella, an oceanographic research vessel (Photo courtesy J. Marr Ltd.)

Australia

Marine Radio

Radiolocation/Radionavigation
1606.5-1800
1624
1782

Coastal Stations
(Storm & Gale Warnings)

Call	Station
VJN	Norfolk Is Radio
VIP	Perth Radio
VIR	Rockhampton Radio
VIS	Sydney Radio
VII	Thursday Is Radio
VIT	Townsville Radio

(Maritime Radiotelephone-Small Ships Service)

Call	Station
VIA	Adelaide Radio
VIB	Brisbane Radio
VIO	Broome Radio
VIC	Carnarvon Radio
VID	Darwin Radio
VIE	Esperance Radio
VIH	Hobart Radio
VIM	Melbourne Radio

JAPAN

Coastal Stations

JDT	Yokosuka	JNG	Okinawa
JFA	Miwa	JNJ	Kagoshima
JFH	Okinawa	JNK	Nagasaki
JGC	Kanagawa	JNL	Hokkaido
JGC	Yokohama	JNN	Miyagi
JGD	Hyogo	JNR	Fukuoka
JNA	Tokyo	JNT	Nagoya
JNB	Okinawa	JNV	Niigata
JNC	Kyoto	JNX	Hokkaido
JNE	Hiroshima		

Maritime Safety Agency

4276 8492

12942

Emergency Channel
4630

Centre International Radio Medical (CIRM)

Station IRM in Rome provides medical advice to ships worldwide. CW communications are conducted on nine frequencies with ships replying on nearby telegraphy frequencies: 4342.5 4350.5 6365 6420 8685 12748 12760 17105 22525. Alternatively, ships may contact IAR or Rome Radio:

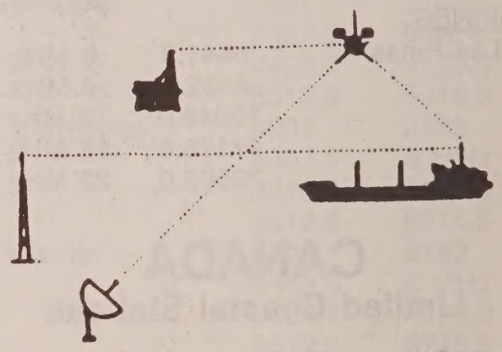
IAR	Rome Radio
4292	8778.6
4320	8796.4
6409.5	13125.6
6418.2	17239.1
6435.5	17248.4
8530	17304.2
8669.9	22599.1
13015.3	22627
16895.3	
17005	
17160.8	
22372.4	
22378	

Medical Advisory System (MAS)

Many (if not most) vessels at sea are poorly equipped to handle medical emergencies which often arise with no hope of immediate assistance. Whether an accident or illness, stricken victims may face a bleak prospect of rescue and recovery.

With physicians on hand round the clock and operating out of Owings, Maryland, Medical Advisory Systems, Inc. (MAS) utilizes the following frequencies (USB) for ship to shore voice conferencing.

4983	16450
7952	16590.2
12327	22722



International Red Cross Emergency Network

Due to its humanitarian nature, the International Red Cross enjoys immunity during armed conflict. In turn, no military or strategic involvement is allowed. Language spoken on the airwaves must be French or English and in the clear (no encoding).

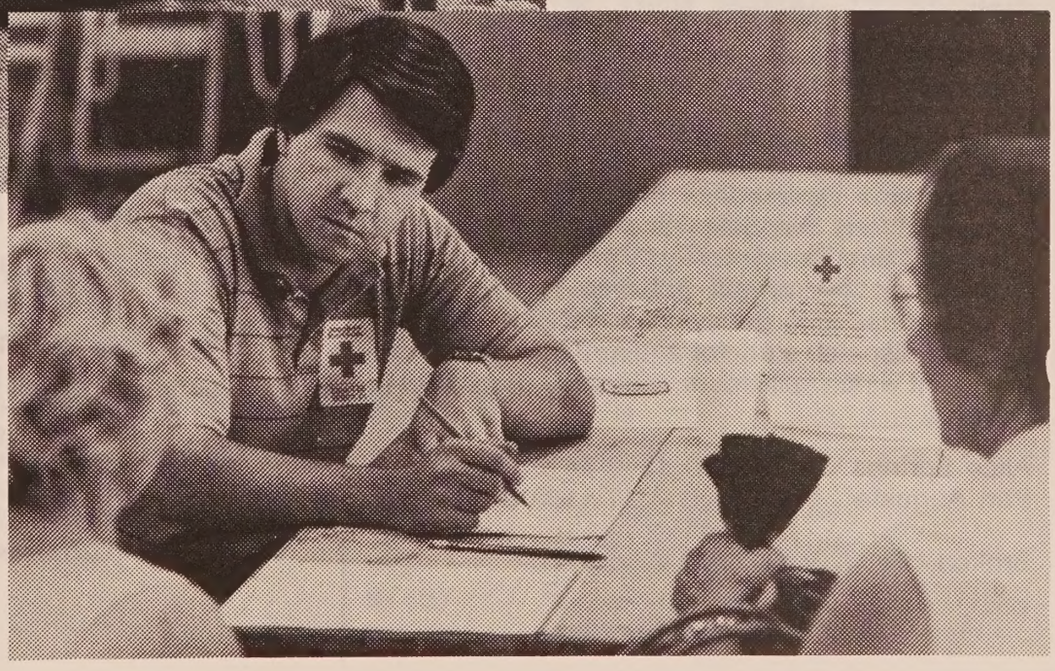
Emission will be CW or SSB with field portable stations transmitting 150 watts of power. Geneva base station power is 800 watts. Frequencies underlined are most commonly reported.

Frequencies

3801.5	13973	20815
6998.5	13998.5	20942
13915	20735	20993.5
13965	20753 (Pri)	27998
		29701.5

Callsign	Location
APR88	Islamabad, Pakistan
CER88	Santiago, Chile
CICR5	Luang Prabang, Laos
CPCR88	Asuncion, Paraguay
CPR88	La Paz, Bolivia
CRC88	Lome, Togo
CX8CRU	Montevideo, Uruguay
DKR82	Bonn, West Germany
DUG88	Manila, Philippines
EAR88	Madrid, Spain

A Red Cross team on the scene at a national disaster



Red Cross worker interviews applicants for emergency care (photos courtesy American Red Cross)

HBC88	HQ Versoix, Switzerland
HBC88A	Geneva, Switzerland
HCR88	Quito, Ecuador
HHR88	Pt-au-Prince, Haiti
HICR88	Santo Domingo
HJC88	Bogota, Colombia
HPC88	Panama City, Panama
HRC8	Tegucigakoa, Honduras
HSR59	Bangkok, Thailand
ICRC1	Decca, Bangladesh
JYL88	Amman, Jordan
OAR88	Lima, Peru
ODR88	Beyrouth, Lebanon
OER88	Vienna, Austria
PGA88	The Hague, Netherlands
SAR88	Stockholm, Sweden
SUR88	Cairo, Egypt
S2C88	Dacca, Bangladesh
TICR88	San Jose, Costa Rica
TDR88	Guatemala
VPR88	Nassau, Bahamas
VWA510	New Delhi, India
XUR88	Phnom Penh, Khmere Rep.
XWR88	Vientiane, Laos
YKR88	Damascus, Syria
YNCR88	Managua, Nicaragua
YVPR8	Caracas, Venezuela
YSCR88	San Salvador, El Salv.
4XR88	Jerusalem, Israel
4WA2	Sanaa, Yeman
8PRC88	Bridgetown, Barbados
9JR88	Lusaka, Zambia

Australian Outpost Communications

To serve the extensive outpost separation on the Australian continent, an HF network has been implemented for convenience and safety.

Royal Flying Doctor Service (RFDS)

The extreme remoteness of outback cattle and sheep stations mandates this extensive medical network. Supported mostly by private contribution and some government subsidy, RFDS centers monitor these emergency channels 24 hours a day and can dispatch a doctor and ambulance plane to any point within two hours. There is no charge to patients.

Alice Springs	VJD	2020 4350 5410 6950
Port Augusta	VNZ	2020 4010 5145 6890 8165
Broken Hill	VJC	2020 4055 6920
Cairns	VJN	2020 2260 4880 Tx 4926 Rx 5145 5300 6785 Rx 6866 Tx 7465
Charlesville	VJJ	2020 4980 6845 7307 Tx 7410 Rx
Mount Isa	VJI	2020 5110 6965 7392 Tx 7475 Rx
Carnarvon	VJT	2020 2280 4045 6890
Meekatharra	VKJ	2020 2280 4010 4880 Tx 4926 Rx 6880 7517 Tx 8147 Rx
Port Hedland	VKL	2020 2280 4030 6960
Derby	VJB	2020 2792 5300 6925
Wyndham	VKF	2020 2805 5300 6945
Kalgoorlie	VJQ	2020 2656 6825 7550 Tx 8144 Rx
Broome	VIO	2760 4940
Hobart	VIH	5355
Darwin	VJY	2020 4010 6840 6975

"School of the Air" Service

The vastness and sparse population of the Australian outback prohibits the establishment of school districts. Education is by HF radio.

Alice Spgs	VZ8BZ	8340 5370 8035
Katherine	VL5SK	4860 5731 7340
Broken Hill	VJC	4635 5130 5735 5895 6920 7565 8150
Cairns	VJN	5300 5865 4980 5227 6845 6945
Mt Isa	VJI	5110 5445 6965
Carnarvon	VJT	4045 5230 6890
Meekatharra	VKJ	4010 5260 6880
Port Hedland	VKL	4030 6960
Derby	VJB	5200 5300 5850 6925
Kalgoorlie	VJQ	5010 5360 5740 6825
Port Augusta	VNZ	4010 5145 5845

New South Wales Police Network

3732 3752 4560 7660(pri) 10505

Northern Territory Police Network

5915

Spain

4053	CW/RTTY	Spanish Police Network
9092	CW/RTTY	Spanish Police Network

Honduras

6800	World Relief (food to refugee camps)
7775	Christian missions (San Luis)

The Caribbean Emergency Network

At the present time 20 Caribbean states participate in this disaster preparedness network which ranges from Belize in the west to Barbados is the east, and from Guyana in the south to the Bahama Islands in the north. All communications are SSB voice.

The net control station (NCS) identifies as DISPREP ANTIGUA and is located in the office of the Pan-Caribbean Disaster Preparedness and Prevention Project (PCDPPP) at St. John's Antigua.

Net practice sessions are held Tuesdays and Fridays at 1330 UTC on 7850 kHz USB (channel 2) for the eastern Caribbean group, and at 1400 UTC on 7453.5 kHz LSB (channel 5) for the western Caribbean group. Both of these frequencies are also used Caribbean-wide for routine traffic.

Other frequencies used throughout the Caribbean include:

kHz	
2182	USB (Marine emergency only)
2527	USB (Marine emergency only)
6977.5	USB (National Weather Service net; ch.6)
7453.5	LSB (Routine traffic)
10100	LSB (Emergency only)
13965	USB (PCDPPP/Red Cross communications)
14303	USB (Amateur; emergency only)

Occasional relays are needed when propagation is poor; in these cases, Federal Emergency Management Agency (FEMA) station WGY932 in Puerto Rico provides assistance.

The Eastern Caribbean Group

Utilizing the calling frequency 7850 kHz USB (channel 2), a common language (English) and, with the exception of Guyana, the same time zone, the following states monitor mutually; Guyana, Trinidad and Tobago, Grenada, St. Vincent, Barbados, St. Lucia, Dominica, Montserrat, Nevis, Anguilla, St. Kitts, Antigua, and Tortolla.

Additional frequencies available for this group include:

kHz	
13996.5	USB (Red Cross communications)
7220	USB (Emergency only)
7453.5	LSB (Routine traffic)
3815	USB (Emergency only)
3616	USB (Emergency; amateur; inter-island police)

The Western Caribbean Group

Crossing time zones and languages (English, French and Spanish), members include Belize, Dominican Republic, Jamaica, Haiti, Turks and Caicos Islands, and the Bahama Islands. This group monitors 7453.5 kHz LSB. Amateurs may use 7150 kHz LSB for emergencies only.

Call Signs and Locations:

DISPREP	Pan-Caribbean Disaster Preparedness and Prevention Project
HHP57	Haiti Emergency Operations Center
J6P	St. Lucia Police HQ
J6L	St. Lucia National Coordinator's Office
J39AI, J39YK	Grenada
WGY901	St. Thomas Civil Defense (FEMA)
WGY932	Puerto Rico Civil Defense (FEMA)
ZJL89	Tortola
ZOA	Antigua Police HQ and EOC
ZOB	St. Kitts Police HQ and EOC
ZOD	Dominica National Coordinator's Office
ZOG	Grenada
ZOM	Montserrat Police HQ
ZON	Nevis
ZOU	Anguilla
6YODP	Jamaica
6YX	Jamaica Coast Guard
8PF	Barbados Coast Guard
9YA	Trinidad Coast Guard
9Y4ST	University of the West Indies seismic unit

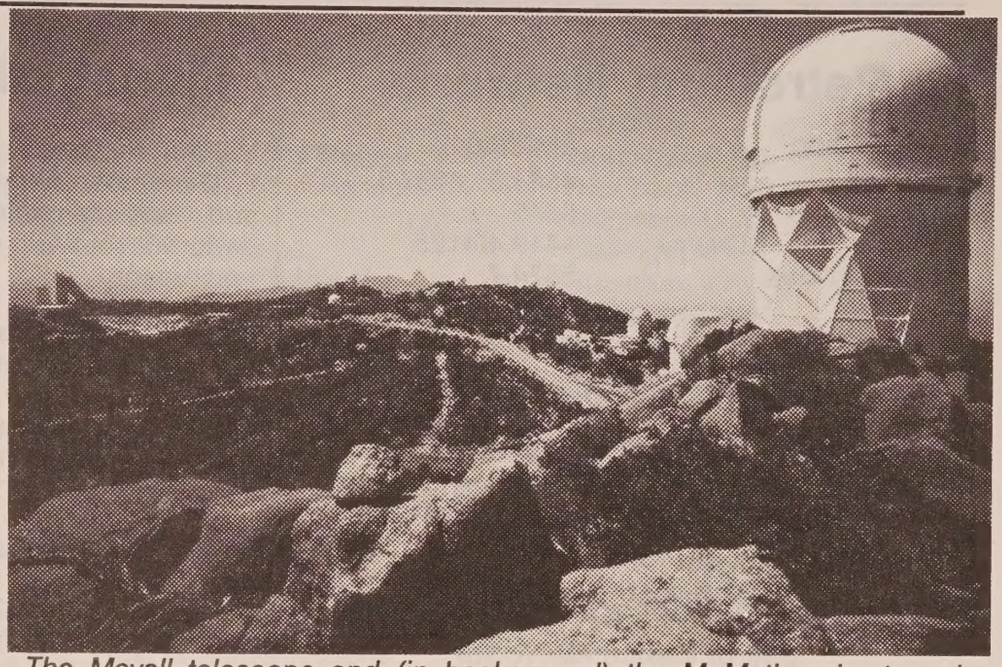
Netherlands Antilles

An emergency and weather network has been established for the Netherlands Antilles as well; listen for their practice drills daily during storm season at 1030 and 2230 UTC on the amateur frequency 3815 kHz LSB.

Astrophysical Observatories

Smithsonian Institution
Cambridge, MA (Call Sign: KCW21/KEP78)
Frequency: 20610
Mode: ASCII (110 Baud/850 Hz shift); some LSB voice

Remote Facilities (Satellite Tracking):
Arequipa, Peru - OCK25
Natel, Brazil - NA4XK (20089 kHz)
Orroval Valley, Australia
Mount Hopkins, AZ
Recife, Brazil - PP7A



The Mayall telescope and (in background) the McMath solar tunnel telescope (courtesy National Optical Astronomy Observatories/Kitt Peak.

Kitt Peak National Observatory
Tucson, Arizona
(Call Sign: KFK92)
Frequencies: 10190 and 20875 MHz
Mode: LSB/ASCII

Remote Facility:
Inter American Observatory at Cerro Tololo (La Serena), Chile
Call Sign: XQ8AFI

Arecibo Ionospheric Observatory
Puerto Rico (Call Sign: WDR71)
Frequencies:
3156 4438 5060 5730 6765 7300 9040 9775 10100 10190 11400 11975 13360 14350 15450 17360 18030
Mode: ASCII

Remote Facilities:
Unknown site WDR72
Ithaca, NY (Cornell University)
Cleveland, OH (Case/Western Reserve University)

California Institute of Technology
Variegated Glacier, AK
Frequency: 5472

Utah State University (KK2XJT)
to **Siple Station Antarctica** (KK2XJS)
Frequencies: 1000 2505 5005 10005 15010 20010 21870

University of Alaska
Fairbanks, AK (Call signs KM2XNZ KA2XUA)

Frequencies: 3192.5 5736.5 9941.5 12256.5

Firestone Network
U.S. - Liberia Radio Corporation

The Firestone Tire and Rubber Company has maintained a RTTY (now TOR/ARQ) network between its Akron headquarters and its Harbel, Liberia, rubber plantation since 1929. It is registered as a common carrier offering its services on a secondary basis to other commercial users as well. Underlined frequencies are primary.

Akron, Ohio

Freq-kHz	Call	Freq-kHz	Call
7775	WQA27	15940	WQB25
10265	WQB20	19335	WQB39
13945	WQB23	19780	WQB29
15780	WQB35		

Harbel, Liberia

Freq-kHz	Call	Freq-kHz	Call
7580	ELE7	15940	ELE25
10310	ELE10	18530	ELE18
13945	ELE12	19335	ELE39
14605	ELE14	19780	ELE19
		19940	ELE29

Petroleum Networks

Location	Frequency
U.S.	4634.5 4637.5 5645
Duplex	4419.4/4125
North Sea	5374.7
Libya	7971
Australia	9040.6

Phillips Petroleum Net

Location	Frequency
Jurigas, Mindinao	10405 (RTTY/LSB)
Jakarta, Indonesia	13310 (RTTY/USB)
(RTTY)	14445

Petroleum Helicopters, Inc (PHI)

Gulf of Mexico Net (USB)
New Orleans to Brownsville and
to Offshore Oil Platforms

Ch 1	4550
Ch 2	8070 (pri)
Ch 3	11470

Offshore Navigation, Inc.

(KA2307)

Location	Frequency
Harahan, Louisiana	4455 (USB)

Mobile Oil Network (Canada)

Offshore petroleum exploration and recovery communications utilizing USB and facsimile may be heard on a number of frequencies among boats, helicopters, portable land stations, and drilling platforms around Nova Scotia.

CJR681	Sable Island	portable
VCC43	Dartmouth	portable
VCD643	Sable Island	drill rig

2381.5	4573.5	5283
2730.5	4603	5916.5
3214	4621.5	7350
3354.5	5116.5	7862.5
3496.5		

Industrial/Scientific/ Medical (ISM)

Frequency	Use
6780 13560 27120	Heating, welding

Industrial Radio Service

Utilizing the block of frequencies set aside by the FCC for emergency use, several major power, fuel and wireline telecommunications companies perform routine on-air tests of their radio equipment.

Bell Telephone operating companies are probably the most frequently heard, conducting their National Security Emergency Preparedness (NSEP) tests on channelized frequencies as shown below. Regional networks and their participants are also listed.

A nationwide Bell net meets the last Tuesday of the month at 1800 UTC on channel 45 (7552 kHz) using USB, RTTY (170 HZ shift, 45/50/75/100/110 baud, reverse polarity), ASCII (170 Hz shift, 110 buad, reverse polarity) and packet. Additional frequencies may include 2194, 3155, 4438, 5005, 6763 and 7300 kHz.

Ch/Freq kHz/Notes	Ch/Freq kHz/Notes
Base/Mobile	31 5102
11 2289	32 5313.5
12 2292	33 6800 Night only
13 2395	34 6803
14 2398	35 6806 W. US
15 3170	36 6855 Night only /W.US
16 4538.5 Night only	37 6858 Night only
17 4548.5 Night only	38 6861 W. US
18 4575	39 6885 Night only
19 4610.5	40 6888 Night only
20 4613.5	41 7480
21 4634.5	42 7483
22 4637.5	43 7486 E. US
23 4647	44 7549 Day only
Base Only	45 7552
24 5046.5 E. US	46 7555 W. US
25 5052.5 E. US	47 7558 W. US
26 5055.5 E. US	48 7559 W. US
27 5061.5 W. US	49 7562 W. US
28 5067.5	50 7697
29 5074.5 E. US	
30 5099.2	

BUSINESS, SCIENTIFIC, PRIVATE

Bell Telephone NSEP Net

Call Sign	Company	Location
WNFT417	Bell Communications Research	Morristown, NJ
WNFT417	Bell Communications Research	Red Bank, NJ
WNGN547	Indiana Bell	Indianapolis, IN
WNGQ469	New York Telephone	Linlithgo, NY
WNHK760	Chesapeake and Potomac	Staunton, VA
WNHK761	Chesapeake and Potomac	Culpepper, VA
WNHM961	Chesapeake and Potomac	Fairmont, WV
WNHM965	Chesapeake and Potomac	Martinsburg, WV
WNHM969	Chesapeake and Potomac	Beckley, WV
WNHN755	Michigan Bell	Southfield, MI
WNHP857	South Central Bell	Gadsden, AL
WNHU799	Southern Bell Telephone	Atlanta, GA
WNIC425	Illinois Bell	Champaign, IL
WNID658	Southern Bell Telephone	Jacksonville, FL
WNIM867	Southwestern Bell Telephone	St. Louis, MO
WNAX939	?	?
WNIM435	U.S. West Communications	ID
WNKG722	Pacific Bell Telephone	?
WNKR875	Pacific Bell Telephone	?
WNLP942	Pacific Bell Telephone	?
WNME910	?	?

Southwestern Bell Net

WNIM867	Southwestern Bell Telephone	St. Louis, MO
WNHI785	Southwestern Bell Telephone	Little Rock, AR
WNHT324	Southwestern Bell Telephone	Oklahoma City, OK
WNID675	Southwestern Bell Telephone	Topeka, KS
WNIY791	Southwestern Bell Telephone	Houston, TX
WNJK493	Southwestern Bell Telephone	Kansas City, MO

Bell Atlantic Net

WNHK760	Chesapeake and Potomac	Staunton, VA
WNHK761	Chesapeake and Potomac	Culpepper, VA
WNHM961	Chesapeake and Potomac	Fairmont, WV
WNHM965	Chesapeake and Potomac	Martinsburg, WV
WNHM969	Chesapeake and Potomac	Beckley, WV

Additional Participants

Call Sign	Agency/Company	Location
KGD34	National Coordinating Center	Arlington, VA
KJL412	?	?
KPA525	?	Chicago, IL

QSL Addresses

WNFT417

Bell Communications Research
435 South Street
Room MRE 1K126
Morristown, NJ 07960

WNFT417

Bell Communications Research
Attn: WNFT417 Manager, 2X410
331 Newman Springs Road
Red Bank, NJ 07701-5699

WNIM867

Southwestern Bell Telephone
Attn: Area Manager-NSEP Operations
1010 Pine Street
St. Louis, MO 63101

BUSINESS, SCIENTIFIC, PRIVATE

Cordless Telephone Base Units (FM)

(Actual frequencies may vary)

1645 1650 1665 1675 1680 1690 1695 1705 1710 1725 1725 1735 1740 1750 1755 1765 1770

NOTE: This old band plan has been superseded by the newer 46/49 MHz units. No units are manufactured any longer in the 1700 kHz band and use will gradually expire.

Experimental Service

A variety of modes (SSB, CW, pulse, FSK) are used by licensees to develop new technologies. Some of these are used to support government communications, often air-to- ground or ship-to-shore.

Licensee	Callsign	Location	Frequencies (kHz)
Magnavox	KM2XBO	Nationwide	2005 2204 2510 5005 15010 20010 21870 25005
SRI Int'l	KM2XBR	Palo Alto, CA	2422 3240 3365 4438 5005 5730 5950 5985 7300 9040 9500 10100 11700 11975 13410 14350 15100 15450 17360 17700 18030 20010 21450 21750 22720 23100 23350 25600 25800 27410 29700
SRI Int'l	KM2XDH	Stanford, CA	
SRI Int'l	KM2XET	Towson, CA	
Metromedia	KM2XFL	St. Louis, MO	6950 7411 14446 14455
RCA	KM2XHQ	Camden, NJ; Indianapolis, IN; Burlington, MA; Rockledge, FL; West Windsor, NJ	3102 3104 4040 5270 6845 11195 15056
Cincinnati Elec.	KC2XIG	Cincinnati,OH	2200 5300 6900
ITT	KC2XJB	Raleigh, NC	2006 2031 2065 2079 2206 2458 2599 2782 3258 4072 4100 4169 4190 4225 6220 6252 6285 6339 8201 8334 8380 8450 12373 12490 12570 12660 16511 16648 16760 16890 22043 22178 22280 22360
Bell Tel	KM2XRA	FL, WA, CA	2118 2132 2142 2158 2206 2514 2530 2550 2538 2598
Navidyne	KM2XRQ/ XRR	Newpt Nws,VA	1600 4063 6200 8195 12330 16460 22000
Motorola	KM2XQJ	Ft.Lauderdl,FL	2003 2225 2638 4125 4145 4176 4178 4419 5250 6220 6268 6522 8291 8296 8298 12429 12432 12520 12523 16587 16695 22124 22226
GTE	KM2XOP	Needham, MA; Rome, NY; Washington, DC; Raleigh-Durham, NC	3340 4438 5005 5730 7300 9040 10100 11975 13360 14350 15450 17360 18030 20010 21750 22720 23350 25600 27410 29700
Eyring Resrch	KM2XLP	Provost, UT	1600 1614 1700 2197 2200 2242 2398 2458 2510 2598 2600 3191 4040 4044 5100 6100 6171 7354 7731 8015 9500 10100 10120 10707 15100 15343 19049 22903 23100 24930 25100 27743 29933

Rockwell-Collins Network:

KM2XHY/KM2XHZ	Newport Bch, CA	2398 4797 6153 6171 6174.5 9657 11763 16343 15407.5 21727 27740 29930
KM2XLB KM2XLC	Cedar Rapids, IA; and Richardson, TX	5760 5960 6060 6160 10200 10400 10600 10800 15760 15860 15960 16060 16160 25230 27440 29720
KC2XKG KC2XKJ	Cedar Rapids, IA; and Newport Bch, CA	2810 4991 5060 5841 7655 7657 7780 9240 9497 9802 11073.5 11076 12222 14350 14686 14690 15955 17601 18666 19131 23403
KM2XLF	Nationwide	2398 3281 4797 6153 6174 9657 11763 15343 21727 25343 27740 29930
KM2XMN	Richardson, TX	2851 3004 3443 5251 5469 5571 6550 8822 10045 11288 11306 13312 17964 21931

Amateur and Citizen's Band Radio

Amateur Radio Bands (USA)

160M	1800-2000
80/75M	3500-4000
40M	7000-7300
30M	10100-10150
20M	14000-14350
17M	18068-18168
15M	21000-21450
12M	24890-24990
10M	28000-29700

10-M REPEATERS

In	Out
29520	29620
29540	29640
29560	29660
29580	29680

Amateur Satellites

Downlink: 29300 - 29500
Orbital periods: Oscar 95-103 min.; RS 118-120 min.

Satellite	Beacon Frequency
Oscar-8 (USA)	29402 (transponder 29400-29500)
Oscar-9 (USA)	7001 14001 21001 28001
RS-3 (USSR)	29321
RS-4 (USSR)	29361
RS-5 (USSR)	29452 (transponder 29331)
RS-6 (USSR)	29453 (transponder malfunctioned; carrier 29352)
RS-7 (USSR)	29501 (transponder 29341)
RS-8 (USSR)	29502 (transponder 29460-29500)

Amsat Worldwide Network

3850	(Wed. 0200/0300/0400)
14282	(Sun. 1900 UTC)
21280	(Sun. 1800 UTC)

Radio Amateur Civil Emergency Service (RACES)

During wartime, amateur radio operations are prohibited; only authorized RACES stations are allowed on the air as an adjunct to defense communications.

1800-1825	14047-14053
1975-2000	14220-14230
3500-3550	14331-14350
3930-3980	21047-21053
3984-4000	21228-21267
7079-7125	28550-28750
7245-7255	29237-29273
	29450-29650
Military Calling	3997

Hurricane Networks

Florida area	3935, 3940, 7268, 7247, 14320, 14325

CB Channels (USA)

Ch	Freq kHz		
1	26965	21	27215
2	26975	22	27225
2	26985	23	27255
4	27005	24	27235
5	27015	25	27245
6	27025	26	27265
7	27035	27	27275
8	27055	28	27285
9	27065	29	27295
10	27075	30	27305
11	27085	31	27315
12	27105	32	27325
13	27115	33	27335
14	27125	34	27345
15	27135	35	27355
16	27155	36	27365
17	27165	37	27375
18	27175	38	27385
19	27185	39	27395
20	27205	40	27405

Certain common usage agreements are generally observed on the CB channels, including AM mode on channels 1 through 35 and SSB from channels 36 through 40. Channel 6 is populated by black ethnic conversation; Channel 9 is used for emergency and calling; channel 10 has its truckers' support groups; channel 19 is occupied by east/west truckers; and channel 21 is used by north/south truckers.

BUSINESS, SCIENTIFIC, PRIVATE

Freeband Radio

A deluge of unlawful Japanese and Taiwanese transceivers featuring as many as 200 or more channels in 10 kHz increments, 25.5-28.5 MHz, with AM, FM and SSB modes, has encouraged the chaos surrounding the legitimate CB radio service. Most operators, however, have the presence of mind not to intrude into the 28 MHz amateur band.

Still, a pattern has emerged, subscribed to by bands of operators who may call themselves--and one another--"renegades", "rogues", "outlaws", "outbanders", or "freebanders".

Generally speaking, 26.325-26.965 MHz is inhabited by AM operators. Channelization is usually in 10 kHz increments.

Within the frequency range of legitimate CB there are several channels reserved for industrial services including 26.995 (3A), 27.045, 27.095, 27.145, and 27.195 MHz. Frequently assigned here are radio controlled toys, rural electric power companies (REA power grid control) and water and gas utility companies (level control).

SSB is the dominant mode (usually LSB) between 27.405 and 27.995 MHz, with the most popular U.S. frequencies between 27.445 and 27.605 MHz. These sideband operators may sound more professional and often use ham type, alphanumeric call signs. Groups here include "April", "Xray", "Whiskey", "World Radio", "Kolo Papa" (Knights Patrol International), "Adam and Eve", "SSB", "USS", and "Tango".

The outlaws do, however, have some favorite hangouts even within assignable CB channels. Channel 5 is popular among high power groups like the Armadillo Operators, Bullshippers, and Tuckers. When the channel gets crowded, they switch to channel 3A.

Terrorist Networks

A suspected international terrorist net in South America has been reported on several frequencies from 14400-14500 kHz USB. 14436 appears to be a primary frequency and callups have been noted on some frequencies at 2100 UTC. Language is a mix of Spanish and Arabic.

Drug Smugglers

Several common frequency ranges are used by drug smugglers, the majority of which bring their illicit cargos to the coasts of Florida and the Carolinas from Central and South America. Spanish language dominates, although salty English dialogue is common.

Traditionally, amateur radio transceivers are used, operated just above the 40 and 20 meter ham bands. Additionally, frequencies near the 6 MHz ship-to-shore band are also utilized. Frequently heard ranges include 6500-6900, 7400-7600 and 14350-14600 kHz.

Unknowns

There will always be signals heard throughout the spectrum which, for one reason or another, remain unidentified. These may be incidental radiations from electronic equipment, illicit communications links, unlicensed transmitters, diplomatic correspondence, military transmissions and other taunting transmissions as well.

A small sampling of this category is reprinted below. Reader additions and identifications are welcome.

Freq.	Mode	Call Sign	Comments
6634	USB	First names	Ship to shore personal radio
6657	USB	First names	Ship to shore personal radio
14500	USB	4USC, 6USB	Morale phone patches (embassy?)
15400	USB	WTS7482	also 10400, 11400, 12400, 13400, 14400
25835	FM	CB handles	(A.B.F?) truck convoy from Indianapolis
25870	FM	First names	Hobby communications
26050	FM	First names	Adventist counseling; radiotelephone

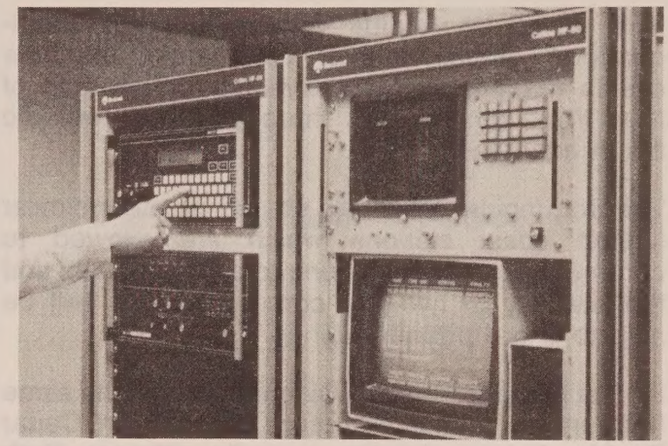
Collins Radio Networks

For decades, Collins Radio (now a division of Rockwell) has supported development of communications systems for all branches of military, government and industry. From a sophisticated electronic complex at Cedar Rapids, Iowa, additional transmitter sites are remotely keyed up at Richardson, Texas and Newport Beach, California.

Most of these transmissions are single sideband (upper sideband dominating). They are used for equipment tests in the aeronautical, maritime mobile and fixed services. KHR and KHT are maritime coastal radio stations, heard on frequencies in that service.

Freq kHz/Callsign	
2398	Data
4797	Data
5559	Air/Ground
5760	Fixed
5960	Fixed
6060	Fixed

Collins' "Comm Central" communications system



The Collins HF-80 series

6153	Data
6160	Fixed
6172.5	Data
6669	Air/Ground
9657	Data
10200	Fixed
10400	Fixed
10600	Fixed
10800	Fixed
11287	Air/Ground
11763	Data
15343	Data
15407.5	Data
15760	Fixed
15860	Fixed
15960	Fixed
16060	Fixed
16160	Fixed
21727	Data
21931	Air/Ground
25230	Fixed
27440	Fixed
27740	Data
29720	Fixed
29930	Data

Callsign	Location
KA2XAH	Richardson, TX
KHB	Newport Beach, CA
KHT	Cedar Rapids, IA
KK2XHQ	Richardson, TX
KK2XHR	Richardson, TX
KLK2	Cedar Rapids, IA
KM2XLB	Cedar Rapids, IA
KM2XLC	Cedar Rapids, IA
KM2XLF	Puerto Rico
KM2XHY	Newport Beach, CA
KM2XHZ	Newport Beach, CA
WMF6	Richardson, TX

KHT at Cedar Rapids (Collins/Rockwell headquarters) pinpoints their commercial maritime clients (Exxon, Maritime Oversea Corporation of New York, others) with three giant log periodic beam antennas.

The frequencies used are shared by other similar limited coast stations which are allowed to communicate only with contracted companies and the majority of two-way communications will be ship to shore phone patches.

KHR at Newport Beach, California, shares the same frequencies and is remotely keyed from Cedar Rapids. It has one log periodic antenna. Both antenna installations are capable of 6-60 MHz continuous coverage but are used only up to 22 MHz on the maritime bands.

Aircraft

Collins also supports flight test operations of radionavigational equipment on frequencies authorized for that purpose. Listen for 71CR (turboprop), 80CR and 82CR (jets) on the following frequencies: 6550 8822 10045 11288 11306 13312 17964 21931 kHz.

All of these frequencies are "pool;" that is, they are shared with other services. On one occasion the Department of Energy (KP6) came up on 13312 and asked Collins what they were doing there! The shortwave spectrum is a busy place.

In the past, the Collins/Rockwell facilities have even checked into U.S. Air Force and Navy nets using the callsign "Rasputin."

Alaska Public Fixed Radio Service

HF SSB Carrier Frequencies

NOTES:
1. Ketchikan Receive
2. Kodiak Receive
3. RTTY operation may be authorized
4. Ketchikan Transmit
5. Cordova Receive
6. Juneau Receive
7. Kodiak Transmit
8. Juneau Transmit
9. Fairbanks Transmit
10. Anchorage Receive
11. Fairbanks Receive
12. Anchorage Transmit
13. Alaska Div of Emergency Services
14. Alaska Calling and Emergency

Freq	Ch	Freq	Ch	Freq	Ch	Freq	Ch
1643		2430		2632[55]		3362[12]	1
1646		2447		2691		3365	
1649		2450		2694[6]	1	4035	
1652		2463		2773		4791.5[9]	2
1657		2466		2776[1]	2	5134.5[10]	2
1660		2471		2781[7]		5135.0[13]	
1705		2474[2]		2784[8]	1	5137.5[10]	3
1709		2479		3164.5		5164.5	
1712		2482		3167.5[9]	1	5167.5[14]	
2003		2506[3]		3180[4]	2	5204.5	
2006		2509		3183		5207.5[11]	2
2115		2512		3198		5370[12]	2
2118		2535		3201		6948.5[3]	
2253		2538		3238[10]	1	7368.5[3]	
2256[1]	2	2563		3241[8]	2	8067	
2312		2566		3258		8070	
2400		2601		3261		11437[3]	
2419		2604[4]	1	3303		11601.5[3]	
2422		2616		3354[11]	1		
2427		2629		3357[6]	2		

Canadian Radio Common Carriers

Canada Hydrant Service, Ltd

SSB

29920

Canadian Nickel Co, Ltd

SSB

2567.5	Yukon BC Ont PQ Nfld

Shell Resources Canada, Ltd

SSB

2621.5	NWT Alta Sask Ont PQ Nfld

Bell Canada

SSB

3299.5	NWT PQ
4630.5	NWT PQ
5186.6/4964.5	Ont
7401.5/7547.5	Ont

Teleglobe Canada

SSB

6830	PQ to France
13745	PQ to Moscow
14392.5	PQ to France
18180	PQ to Moscow
19295	PQ to Moscow

RTTY

4465	PQ to France
6830	PQ to France
7310	PQ to Eagles Nest
10520	PQ to France
14357.5	PQ to Chacarilla
14392.5	PQ to Carrington & France
14790	PQ to Eschborn

Panarctic Oil, Ltd

Rea Pt., NWT, (XNU802)

RTTY		USB
3311.5	NWT	3310
4036.5	NWT	5281.5
		5411

Bema Industries

RTTY

5134	BC
7508.5	BC
9148.5	BC

Mobile Oil Canada

RTTY

6874.5/8092	NS

G D Bruno

RTTY

3311.5	Alta

Canadian Broadcasting Corp

SSB

5925	Sackville NB to CFB Lahr W Germany
9445	same

Austin Airways, Ltd

SSB

9081.5	Ont PQ
11651.5	Ont PQ

British Petroleum Exploration Canada

RTTY

2381.5/2633.5	Nfld
3214/3397.5	Nfld
4573.5/5061.5	Nfld
5149/5441.5	Nfld

Asbestos Corp

RTTY

2689.5/3206.5	NWT
3206.5/2689.5	PQ
4009/4448	NWT, PQ to France

Lynes United Service

RTTY

3311.5	Alta
4603	Alta
6966.5	Alta

Hudson's Bay Co

SSB

4837	NWT Man Ont PQ

Gulf Minerals Canada, Ltd

SSB

5289.5	NWT Sask Man Ont

Imperial Oil, Ltd

SSB

5436.5	Yukon NWT BC Alta Sask PQ Nfld

RTTY

4165	Nfld
6247	Nfld
8330.5	Nfld
12482	Nfld
16639	Nfld
22163	Nfld

Remote Radiotelephone Network
Vancouver, British Columbia
Remote Sites such as Logging Camps and Mines.

Ch	Receive	Transmit
VL1	6825	6790
VL2	5405	5810
VL3	4865	5405
VL4	3270	3171
VL5	3359	3213.5
VL6	4820	4610
VL7	4543.5	4573.5
VL8	7953	7804
VL9	5248.5	5313.5
VL10	2160	2030
VL11	9315	9462
VL12	12080	12181
VL13	7658.5	7818.5
VL14	3300	3224

"Bush Telephone"
Red Deer, Alberta
3241.5 USB

Australia

Outback Telephone 12423

Domestic Broadcasting

The 150-285 kHz portion of the spectrum is used for domestic (home) broadcasting in Europe and Asia. Rarely heard in the United States, this list is included for those listeners who are fortunate enough to pick up some rare DX. Power of these stations ranges from approximately 50 thousand to 2 million watts.

World Longwave Broadcast Stations

Freq	ID	Location	Kilowatts
153		Tipaza, Algeria	1500
	DLF	Donebach, West Germany	500
		Brasov, Roumania	1200
		Engels, USSR	150
		Khabarovsk kray (Far East), USSR	1000
		Ufa, USSR	500
162		Ulan Bator, Mongolia	150
		Allouis, France	2000
		Ardahan, Turkey	200
		Tashkent (Uzbekistan), USSR	150
		Krasnoyarsk kray (Siberia), USSR	50
171		Nador, Morocco	1200
		Kaliningrad, USSR	1000
		Lvov (Ukraine), USSR	500
	RW1315	Moscow, USSR	500
		Syktyvkar, USSR	300
		Yakutsk (Siberia), USSR	500
		Novosibirsk (Siberia), USSR	150
		Rostov-Na-Donu. USSR	1000
		Kyzyl (Siberia), USSR	100
180	DGI	Oranienburg, East Germany	750
		Saarlouis (Felsberg), W.Ger.	2000
	TAR	Ankara (Etimesgut), Turkey	1200
		Aktyubinsk (Kazakhstan), USSR	150
		Alma Ata (Kazakhstan), USSR	250
		Petropavlovsk Kamchatka (Far East), USSR	150
		Tchita (Siberia), USSR	150
189		Caltanissetta, Italy	10
	SBG	Motala (Orlunda), Sweden	300
		Barnaul (Siberia), USSR	50
		Blagoveshchensk(Siber.)USSR	1000
	(TB)	Tbilisi, USSR	500
200		Aleksandrovsk-Sakhalinskiy (Far East), USSR	50
		Burghead, England	50
		Droitwich, England	400
		Westerglen, England	50
		Warsaw, Poland	200
		Etimesgut (Ankara), Turkey	200
	(AB)	Achkhabad (Turkemnia), USSR	75
		Frunze (Kirghizia), USSR	150
	RW166	Irkutsk (Siberia), USSR	250
	(KZ)	Kazan, USSR	50
	(LD)	Leningrad, USSR	150
		Moscow, USSR	100
		Ufa, USSR	300
209		Muenchen-Erchling, W. Ger.	500
	TFU	Eidar, Iceland	20
	TFU	Reykjavik (Vatnsendi), Iceland	100
		Uglii, Bayan-Uglii (Ulan Bator), Mongolia	60
		Dalanzadgad (S.Gobi),Mongolia	150
		Choibalsan (E.Aimak),Mongolia	75
		Azilal, Morocco	800
		Blagoveshchensk(Siberia),USSR	30
209	(KI)	Kiev I (Ukraine), USSR	500
		Skovorodino (Siberia), USSR	50
		Novosibirsk (Siberia), USSR	150
		Nukus (Uzbekistan), USSR	50
2183	AM10	Roumoules, Monte Carlo	1400
	LKO	Oslo, Norway	200
	(BK)	Baku, USSR	500
	(KN)	Krasnoyarsk kray(Siberia),USSR	50
		Yeniseysk (Siberia), USSR	300
		Birobidzhan (Far East), USSR	30
227		Altai Gobi, Mongolia	150
		Ulan Bator, Mongolia	150
		Konstantynow (Warsaw),Poland	2000
		Alma Ata (Kazakhstan), USSR	50
		Tyumen (Siberia), USSR	50
236		Junglinster, Luxembourg	2000
		Arkhanghesk, USSR	150
		Kichinev, USSR	1000
	(LD)	Leningrad I, USSR	1000
		Magadan (Far East), USSR	1000
		Mary (Turkmenia), USSR	500
		Ulianovsk (Kubyshev), USSR	1200
		Irkutsk (Siberia), USSR	500
245		Belebey, USSR	200
		Kalundborg, Denmark	200
	TCP	Erzurum, Turkey	200
		Alma Ata (Kazakhstan), USSR	500
		Karaganda (Kazakhstan), USSR	100
		Vladivostok (Far East), USSR	
254		Tipaza, Algeria	1500
		Lahti, Finland	200
	(FO)	Duchanbe (Tadzhikistan),USSR	300
	(KN)	Kazan, USSR	150
	(EW)	Erevan, USSR	150
263		Plovdiv, Bulgaria	500
		Magdeburg, East Germany	200
		Karaganda (Kazakhstan), USSR	150
	(MK)	Moscow II, USSR	2000
		Tchita (Siberia), USSR	1000
		Alma Ata (Kazakhstan), USSR	500
272		Topolna, Czechoslovakia	1500
	(NV)	Novosibirsk (Siberia), USSR	150
		Orenburg, USSR	15

		Tomsk (Siberia), USSR	100
	(HB)	Khabarovsk kray(Far East),USSR	100
		Tashkent (Uzbekistan), USSR	500
281		Achkhabad (Turkmenia), USSR	150
	(MS)	Minsk/Loshita (Byelorussia)	500
		Sverdlovsk (Siberia), USSR	50
		Ulan Ude (Siberia), USSR	150
		Yuzno-Sakhalinsk(FarEast),USSR	150

Non-Directional Beacons

200-540 kHz non-directional beacons (NDBs) are heard all over the western hemisphere and many foreign locations as well. Used by airports to send homing signals to aircraft, the beacon band contains some of the oldest transmitters still in operation.

The transmissions are full carrier AM, identifying by Morse code every few seconds. Transmitting power ranges from 25 to 4000 watts. While the following list is nowhere near complete, it does contain hundreds of strong signals heard by low frequency listeners.

kHz	ID	Location
194	TUK	Nantucket, MA
198	DIW	Dixon, NC
201	CZM	Cozumel, Mexico
205	XZ	Wawa, Ontario
206	QI	Yarmouth, Nova Scotia
206	GLS	Galveston, TX
207	YNE	Norway House, Manitoba
208	YSK	Sanikiluaq, N.W.T.
212	TS	Timmins, Ontario
212	UCF	Cienfuegos, Cuba
212	YGX	Gillam, Manitoba
214	CHX	Choix, Mexico
215	YSX	San Salvador, El Salvador
216	CLB	Wilmington, NC
218	RL	Red Lake, Ontario
221	SMS	San Marcos, Mexico
223	YYW	Armstrong, Ontario
224	MO	Moosonee, Ontario
224	QM	Moncton, New Brunswick
227	XI	Killaloe, Ontario
227	LCE	La Ceiba, Honduras
230	ILT	Albuquerque, NM
230	QB	Quebec, Quebec
230	SH	Shreveport, LA
230	UGN	Giron, Cuba
232	GT	Grand Turk, Turks & Cacaios
233		Nakina, Ontario
233	ZTC	Treasure Cay, Bahamas
236	GNI	Grand Isle, LA
242	XC	Cranbrook, British Columbia
244	DG	Chute des Passes, Quebec
244	TH	Thompson, Manitoba
245	CB	Cambridge Bay, N.W.T.
245	YZE	Gore Bay, Ontario
247	YLH	Landsdowne House, Ontario
248	QL	Lethbridge, Alberta
248	UL	Montreal, Quebec
248	WG	Winnipeg, Manitoba
248	MBJ	Montego Bay, Jamaica
250	FO	Flin Flon, Manitoba
251	ZQA	Nassau, Bahamas
257	SQT	Melbourne, FL
257	XE	Saskatoon, Saskatchewan
257	YXR	Earlton, Ontario
258	ZSJ	Sandy Lake, Ontario
260	UFX	St. Fekix de Valois, Quebec
260	YAT	Attawapiskat, Ontario
260	MTR	Monteria, Colombia
260	TOY	Tongoy, Chile
260	HOR	San Jose, Costa Rica
262	CTM	Chetumal, Mexico
262	F	Iqaluit, N.W.T.
263	QY	Sydney, Nova Scotia
263	YGK	Kingston, Ontario
266	BR	Atlanta, GA
266	BY	Beechy, Saskatchewan
266	XD	Edmonton, Alberta
267	MAR	Maracaibo, Venezuela
270	OAX	Oaxaca, Mexico
270	HHP	Port au Prince, Haiti
272	YQA	Muskoka, Ontario
272	UVR	Varadero, Cuba
273	ZV	Sept Iles, Quebec
276	YEL	Elliot Lake, Ontario
276	TWT	Sturgis, KY
278	NM	Matagami, Quebec
280	ZWC	Walker Cay, Bahamas
280	IPA	Isla de Pascua, Easter Island
281	SGK	Knoxville, TN
283	PT	Pelee Island
283	UZG	Zaragoza, Cuba
284	QD	The Pas, Manitoba
284	RT	Rankin Inlet, N.W.T.
284	TEH	Techo, Colombia
285	UHA	Quaqtaq, Quebec
286	GD	Goderich, Ontario
286	OE	Dry Tortungas, Florida
287	SMR	Santa Marta, Colombia
288	X	Point Tuna, Puerto Rico
289	YLQ	La Tuque, Quebec
290	CO	Chesapeake L.S., VA
290	FP	Frying Pan Shoals, L.S., NC
290	Y	Yankeetown, FL
290	YYF	Penticton, British Colombia
290	CCG	Caia Cayman Grande, Cuba
290	YNP	Managua, Nicaragua
292	MIQ	Maiquetia, Venezuela

294	J	Jupiter Inlet L.S., FL
295	BDA	Gibbs Hill, Bermuda
295	RHC	Riohaca, Colombia
296	G	Galveston, TX
296	UBO	Batabano, Cuba
300	C	Mobile Point L.S., AL
300	LAP	La Paz, Mexico
300	YIV	Island Lake, Manitoba
300	FXG	Point-A-Pitre, Guadeloupe
300	SFM	San Francisco d'Macoris, Dominican Republic
300	TFE	Tefe, Brazeil
301	AB	Cabo San Antonio, Cuba
302	QW	North Battleford, Saskatchewan
302	TC	Ethelda Bay, British Colombia
302	ZCC	Chub Cay, Bahamas
304	BN	Nashville, TN
304	Z	Aransas Pass, TX
305	RO	Roswell, NM
305	YQ	Churchill, Manitoba
305	UIS	Isabella, Cuba
306	R	St. Johns L.S., FL
307	OT	Southwest Pass Ent. L.S., LA
307	EJA	Barrancabermeja, Colombia
308	TCG	Tulacingo, Mexico
308	PJM	St. Maarten, Neterhland Antilles
310	H	Egmont Key L.S., FL
311	TBG	Panama City, Panama
313	PIL	Brazos Santiago L.S., TX
313	Z	Cape Canaveral, FL
314	YN	Swift Current, Saskatchewan
314	ZN	Portage, Manitoba
314	FXF	Forte de France, Martinique
315	USR	Simon Reyes, Cuba
316	M	South Pass West Jetty L.S., LA
317	CVP	Helena, MT
317	TB	Tybee L.S., GA
317	VC	La Ronge, Saskatchewan
317	ZWE	West End, Bahamas
318	L	San Juan, Puerto Rico
320	HTN	Miles City, MT
320	TY	Tyler, TX
320	W	Cape San Blas, FL
320	YQF	Red Deer, Alberta
323	UT	Calcasieu Pass, LA
323	UWP	Argentia, Newfoundland
323	BSD	St. Davids Head, Bermuda
325	LN	Lumsden, Saskatchewan
325	LRN	La Romano, Dominican Republic
325	VUP	Valledupar, Colombia
326	FC	Fredericton, New Brunswick
326	IA	Houston, TX
326	MA	Midland, TX
326	VV	Wiarton, Ontario
326	YQK	Kenora, Ontario
327	FXC	Cayenne, French Guiana
328	YTL	Big Trout Lake, Ontario
328	HB	Holsteinborg, Greenland
329	CH	Charleston, SC
329	TAD	Trinidad, CO
329	YEK	Eskimo Point, N.W.T.
329	YHN	Hornepayne, Ontario
331	LAN	San Salvador, El Salvador
332	FIS	Key West, FL
332	YFM	La Grande 4, Quebec
332	QT	Thunder Bay, Ontario
332	VT	Buffalo Narrows, Saskatchewan
332	XH	Medicine Hat, Alberta
333	SFD	San Fernando, Venezuela
334	YER	Fort Severn, Ontario
335	HP	Heath Point, Quebec
335	YLD	Chapleau, Ontario
335	MQU	Mariquita, Colombia
336	BNA	Barcelona, Venezuela
338	ZU	Whitecourt, Alberta
339	UCU	Santiago, Cuba
339	A	Havana, Cuba
340	YY	Mont Joli, Quebec
341	TIZ	Tizayuca, Mexico
341	YCS	Chesterfield Inlet, N.W.T.
341	YFN	Cree Lake, Saskatchewan
341	YYU	Kapuskasing, Ontario
343	PJG	Willemstad, Curacao
344	CL	Cleveland, OH
344	JA	Jacksonville, FL
344	XX	Abbotsford, British Colombia
344	YGV	Havre-St. Pierre, Quebec
344	ZIY	Grand Cayman, Bahamas
345	BGI	Bridgetown, Barbados
347	YG	Charlottetown, Prince Edward Is.
348	RSD	Rock Sound, Bahamas
348	UHA	Havana, Cuba
350	ME	Chicago, Illinois
350	NY	Enderby, British Colombia
350	RB	Resolute Bay, N.W.T.
350	RG	Oklahama City, OK
350	DAV	David, Panama
351	YKQ	Fort Rupert, Quebec
351	ANU	Antigua Island, British West Indies
352	RG	Rarotonga, Cook Island
352	TUR	Turbo, Colombia
353	IN	International Falls, MN
353	LI	Little Rock, AR
353	QG	Windsor, Ontario
353	HOT	Higuerote, Venezuela
353	UHG	Holguin, Cuba
355	YWP	Webequie, Ontario
355	SCO	Pisco, Peru
355	TGU	Tegucigalapa, Honduras
356	PB	West Palm Beach, FL
356	TIM	Georgetown, Guyana
359	SDY	Sidney, MT
359	TPX	Tepexpan, Mexico
360	PN	Port Menier, Quebec
360	KIN	Kingston, Jamaica
360	ASN	Ascension Island

BROADCASTING

361	ZMH	Marsh Harbor, Bahamas
362	SB	Sudbury, Ontario
362	SC	Sherbrooke, Quebec
362	ZS	Coral Harbour, N.W.T.
362	CU	Chihuahua, Mexico
362	GND	Point Salinas, Grenada
363	RNB	Millville, NJ
364	SG	Springdale, Newfoundland
365	AA	Fargo, ND
365	FT	Ft. Worth, TX
365	IZT	Ixtepec, Mexico
365	LEN	Leon, Mexico
365	CGW	Cartago, Colombia
365	PAL	Palma, Ecuador
366	YMW	Maniwaki, Quebec
367	HA	Hao Atoll, French Polynesia
368	GYM	Guaymas, Mexico
368	L	Toronto, Ontario
368	SIR	Rawlings, WY
368	VX	Dafoe, Saskatchewan
369	ZDX	St. John, Antigua
370	GR	Iles de la Madeleine, Quebec
370	UCM	Camaguey, Cuba
370	VVC	Villaviencio, Colombia
371	GT	Great Falls, MT
371	GW	Kuujjuarapik, Quebec
371	TS	Memphis, TN
374	SA	Sable Island
374	YIO	Pond Inlet, N.W.T.
375	BM	Balmoral, Manitoba
375	DW	Tulsa, OK
375	ELM	Elmira, NY
375	TGE	Guatemala City, Guatemala
376	ZIN	Great Inagua, Bermuda
378	RJ	Roberval, Quebec
378	UX	Hall Beach, N.W.T.
379	CM	Channel Head, Newfoundland
379	GKQ	Newark, NJ
379	TL	Tallahassee, FL
379	YPQ	Peterborough, Ontario
380	LIO	Puerto Limon, Costa Rica
380	ASH	Aishalton, Guyana
380	UCY	Cayojabo, Cuba
382	EA	Empress, Alberta
382	WS	Wesleyville, Newfoundland
382	XU	London, Ontario
382	YPL	Pickle Lake, Ontario
382	UPA	Punta Alegra, Cuba
382	POS	Piarco, Trinidad
385	EMR	Augusta, GA
385	NA	Natashquan, Quebec
385	FLS	Flores, Guatemala
385	AUC	Arauca, Colombia
387	PV	Providenciales, Turks & Caicos
387	SPP	San Andres Island, Colombia
388	AM	Tampa, FL
388	MM	Fort McMurray, Alberta
388	BOG	Bogota, Colombia
390	JT	Stephenville, Newfoundland
390	VP	Kuujjuaq, Quebec
390	UCA	Ciego de Avila, Cuba
391	DDP	San Juan, Puerto Rico
392	ML	Charlevoix, Quebec
392	NAU	Nautla, Mexico
392	BZE	Belize, Belize
394	YB	North Bay, Ontario
395	KM	Sept Iles, Quebec
395	YL	Lynn Lake, Manitoba
396	PH	Inukjuak, Quebec
396	ZBB	Bimini, Bahamas
398	G	Windsor, Ontario
399	UP	Upernavik, Greenland
400	QQ	Comox, British Colombia
400	BGA	Bucaramanga, Colombia
400	HIV	Santo Domingo, Dom Republic
400	IZP	Iztapa, Guatemala
401	YWN	Winisk, Ontario
402	USJ	San Julian, Cuba
402	C	Camaguey, Cuba
403	BK	Baker Lake, N.W.T.
404	OLF	Wolf Point, MT
404	YSL	St. Leonard, New Brunswick
404	ZR	Sarnia, Ontario
405	YS	Clear Lake, Manitoba
405	YXL	Sioux Lookout, Ontario
407	H	Montreal, Quebec
407	SWA	Swan Island
407	LET	Leticia, Colombia
408	SN	St. Catherines, Ontario
409	YTA	Pembroke, Ontario
410	GDV	Glendive, MT
410	HMM	Hamilton, MT
411	RM	Rocky Mountain House, Alberta
412	ALE	Alejandria, Colombia
413	TAM	Tampico, Mexico
413	YHD	Dryden, Ontario
414	BC	Baie Comeau, Quebec
415	SLS	Salinas, Ecuador
505	SX	Pugus, USSR
510	CE	Maksimk Yar, USSR
510	PO	Hsinchu, Taiwan
510	QK	Kaukey, USSR
511	PW	Kuqa, China
512	FB	Kaiyuan, China
513	PP	Omaha, NE
513	VIS	La Vista, Peru
514	CN	Irkutsk, USSR
514	MC	Mochau, Vietnam
514	YV	Tanghekou, China
515	CL	Port Angeles, WA
515	FPN	Frederick Point, AK
515	OS	Columbus, OH
515	PKV	Port Lavaca, TX
515	RRQ	Rock Rapids, IA
515	SAK	Kalispell, MT
515	NO	Pyongyang, North Korea

516	VPX	Pineville, WV
516	YWA	Petawawa, Ontario
517	FN	Clinton, IA
517	J	Tianjin, China
518	BPX	Offshore, Australia
518	BTA	Offshore, Australia
518	ZM	Chita, USSR
519	EAA	Eagle, AK
520	AW	Arlington, WA
520	BHZ	Belo Horizonte, Brazil
520	LOR	El Valor, Peru
520	AR	Jinan, China
520	D	Hanoi/Gialam, Vietnam
520	MZ	Samarkand, USSR
521	ADS	Dallas, TX
521	DWH	Houston, TX
521	GF	Cleveland, OH
521	GM	Greenville, SC
521	INE	Missoula, MT
521	ORC	Orange City, IA
521	TO	Topeka, KS
524	AJG	Mt. Carmel, IL
524	HEH	Newark, OH
524	HRD	Hardin County, TX
524	MNL	Valdez, AK
524	UOC	Iowa City, IA
525	DQK	Offshore (Chevron), CA
525	PWW	Offshore (Chevron), CA
525	EMB	Embuguacu, Brazil
525	KU	Chiayi, Taiwan
525	PK	Pleiku, Vietnam
525	RL	Sovetsky Rudnik, USSR
526	OJ	Olathe, KS
526	FV	Nizheudinsk, USSR
529	FDV	Nome, AK
529	SQM	Sumner Strait, AK
530	AAW	Talkeetna Mountains, AK
530	NB	North Bay, Ontario
530	YCH	Chatham, New Brunswick
530	KD	Dalian, China
534	SZM	Salmon No.1, AK
535	CHS	Sterlegova, USSR

International Broadcasting Allocations

Frequency Band	Meter Band
150-285 kHz	1900 M
140-1600 kHz	200 M
2300-2498 kHz	120 M
3200-3400 kHz	90 M
3900-4000 kHz	75 M
4750-4995 kHz	60 M
5950-6200 kHz	49 M
7100-7300 kHz	41 M
9500-9900 kHz	31 M
11650-12050 kHz	25 M
13600-13800 kHz	21 M
15100-15600 kHz	19 M
17550-17900 kHz	16 M
21450-21850 kHz	13 M
25670-26100 kHz	11 M

International Broadcast Feeders and Relays

In order to secure program material from home offices, transmitter sites often receive transmissions in the shortwave spectrum for rebroadcast later. These transmissions may be in several sideband modes (see key).

While satellite relay is playing an increasingly greater role, a great deal of HF feeder activity is still monitored on these frequencies.

Key

AFRTS	American Forces Radio & TV Service
B	Bethany
BBC	British Broadcasting Corp
D	Dixon/Delano
DW	Deutsche Welle, Frankfurt
G	KWL61, Greenville
GWC	BBC Daventry
FS	Foreign Service
HS	Home Service
I	Rikisudvarpid, Iceland
IS	Munich
ISB	Independent Side Band (uses both USB & LSB)
K	Kavala
LSB	Lower Side Band
M	Monrovia
R	Rhodes
RFE	Radio Free Europe, Holzkirchen
RM	Radio Moscow
RP	Radio Peking
SABS	Saudi Arabian Broadcasting Service, Riyadh
T	Tangier
UNID	Unidentified
USB	Upper Side Band
VOA	Voice of America

4040	AFRTS-LSB
4465	RFE
4475	RFE
4505	RFE
4555	VOA-D
4565	RFE

BROADCASTING

4565	VOA-D
4882	DW
5125	RFE
5195	DW
5230.8	AFRTS-LSB
5290	RM
5295	RFE
5390	SABS
5434	VOA-T
5455	RM
5460	VOA-T
5470	RM-HS
5745	VOA-G-USB
5760	AFRTS-LSB
5790	RFE
5810	RM
5815	RM-HS
5830	DW-RM
5845	RFE
5875	SABS
5880	RIVADAVIA ARG
5735	VOA-USB
5920	RM
6390	RM-FS
6470	RM
6550	RP
6770	RM-HS
6805	RM
6810	RM
6822.5	RM-HS
6825	RM
6825	RP
6838	BBC-USB
6840	BBC
6847.5	VOA-K/R
6873	VOA-G-ISB/USB
6890	RM
6902.5	VOA-IS
6910	UNID
6920	RM-HS
6942.5	VOA-K/R
6970	RFE-LSB
6975	DW
6980	RM
6987.5	RM
6993	SABS
6995	RFE
7410	RM-HS
7440	UN GENEVA-RM
7442.5	VOA-M
7470	RM
7478	VOA-M
7490	DW
7490	RM-HS
7530	RM
7541.5	RM
7548.5	RM-FS
7572	AFRTS-LSB
7620	VOA-D
7648.5	VOA-G-USB
7651	VOA-USB
7653.5	VOA-LSB
7691	BBC
7722.5	VOA-IS
7767.5	VOA-G-ISB/LSB
7768.5	DW-LSB/ISB
7800	RP
7846	BBC
7893	BBC
7917.5	DW
7925	RM-FS
7955	UNID
7973	BBC-USB
7977	UNID
7991	BBC
8005	RM-LSB
8110	VOA-D
8125	RM-FS
8345	RP
8450	RP
8490	RP
8660	RP
9090	UNID-LSB
9100	BBC
9115	RIVADAVIA ARG
9140	RM-HS
9145	RFE
9145	RM-HS
9150	RM-HS
9170	RFE
9200	RM-HS
9210	RM-HS
9242	AFRTS-LSB
9250	RFE
9290	UNID
9320	BBC-USB/ISB
9334	AFRTS-LSB
9350	VOA-D
9858	BBC
9905	RM
9929	AFRTS-LSB
9989	SABS
10120	RM-FS
10125	RM
10190	RFE-LSB
10235	VOA-G-ISB
10237.5	VOA-LSB/ISB
10315	RFE-USB
10338	RM-HS
10335.4	UNID-USB
10382.5	VOA-G-LSB
10385	SABS
10385	VOA-D
10402	SABS
10415	R.NACIONAL, P-G-LSB

10418	UNID-LSB
10420	RFE
10454	VOA-G-ISB
10456.5	UN RADIO-LSB
10476	UNID
10520	VOA-IS
10530	SABS
10538	AFRTS-LSB
10595	RM
10620	RM-FS
10660	RM-HS
10675	RM
10689	VOA
10690	RM
10690	UNID-USB
10740	RM-FS
10760	VOA-IS
10855	RM-HS
10860	RFE
10865	RP
10866.5	VOA-USB/ISB
10869	UN RADIO
10869	VOA-G
10872	UNID
10877.5	VOA-USB/ISB
10880	VOA-K/R
10922	DW
10935	SABS
10972	VOA-T
10990	SABS
11070	BBC-LSB
11090	VOA-D-ISB/USB/LSB
11092	SABS
11095	SABS
11152.5	VOA-G-LSB
11175	SABS
11445	UNID
11459	BBC
11495	RM-FS
11575	RFE
11575	RM-HS
11585	RM-HS
12127	BBC
12135	RM
12165	RM
12179	BBC
12205	RM-HS
12210	VOA-G
12223	RM-HS
12240	RM-FS
12246.5	RFE
12250	RM
12253	RM-FS
12290	R.AUSTRALIA-USB
12296	R.MONTE CARLO
13380	RM-HS
13395	SABS
13410	RM

VOA

USIA

13462	SABS
13486	SABS
13491.5	VOA-G
13512	DW
13590	RM-HS
13651	AFRTS-LSB
13690	RFE
13710	RM-HS
13720	UNID-USB/LSB
13760	RM-HS
13770	VOA-T
13797	I-USB
13810	SABS
13818	SABS
13820	RM-FS
13855	VOA-K/R
13860	VOA-K
13865	SABS
13885	VOA-K/R
13960	RM-FS
13977	RM-HS
13995	VOA-M
13997.5	VOA-IS
14365	VOA-K/R
14398	VOA-D-LSB/USB/ISB
14456	BBC
14526	VOA-G
14712.5	RFE
14800	VOA-IS
14850	RM-HS
14985	VOA-K/R
15576	SABS
15650	VOA-G
15670	BBC-ISB
15673	VOA
15715	VOA-G
15720	RM
15752	VOA-G
15765	VOA-G
15770	VOA-G
15775	RFE-USB
15780	RM-FS
15790	UNID
15800	VOA-IS
15849	BBC-ISB/USB
15870	R.AUSTRALIA
15875	VOA-M
15877.5	VOA-LSB

15910	BBC
15913	BBC
15920	VOA-M
16030	RM-HS
16040	AFRTS-LSB
16065	RFE
16140	RM
16190	RM
16222	VOA-G
16240	RFE
16247	VOA-T
16250	RM-HS
16330	RM-HS
16330	VOA-M
16433	R.BARIKI
17445	RFE
17490	RP
17560	RM
17580	RM-HS
18137.5	VOA-D
18150	UNID
18157	VOA-D
18172	BBC-ISB
18195	RM-HS
18210	VOA-K-R-M
18215	VOA-G
18265	VOA-G-R-K
18275	VOA-G
18285	RM-HS
18300	RM
18310	RM
18460	RM
18515	VOA-K-R-M
18607.5	VOA-LSB/ISB
18653	RM-FS
18782.5	VOA-USB/ISB
18830	RM-HS
19075	VOA-T
19155	VOA-M
19210	R.AUSTRALIA
19261.5	VOA-B-USB/LSB/ISB
19290	AFRTS-LSB
19320	RM
19455	BBC-ISB
19480	VOA-D-ISB
19505	VOA-G-USB/LSB/ISB
19522	RM
19532.5	VOA-G
19721.5	VOA-G
19725	RM-HS
19755	BBC
19845	RM
19912.5	VOA-G-USB
19915	VOA-D
19918	VOA-G
19922	VOA
20025	UNID
20060	VOA-G-ISB/LSB
20125	VOA-G-LSB/ISB/USB
20192	AFRTS-Patrick to Ascension AFB-LSB Sunday
20215	RFE-LSB
20280	RM-HS
20325	UNID
20345	BBC-USB/ISB
20455	BBC-ISB
20500	RM
20545	RFE-ISB/LSB
20605	RM
20650	RFE
20710	RFE
21455	VOA-B
21760	VOA-M
21800	VOA-M
22925	VOA-D-M
22930	BBC
22970	RFE
23191	BBC
23680	RM-LSB/AM
23826	UNID
23856	RM
25350	RFE
26640	BBC
26490	BBC
26680	RFE

Shortwave Broadcast Frequencies

and how to find them!

To the average person looking through over 1100 shortwave channels, the search for a specific station can be very frustrating. After all, international broadcasters change frequencies four, six--even eight or ten times a year. Add to that the changes in broadcast schedules brought on by daylight savings time (both in Europe and North America!) and it becomes almost impossible to follow. The truth is, you can't tell the players without a program.

What most people don't realize is that shortwave broadcasters have their "old reliables" -- frequencies that are used over and over again. The trick is to find them in the mire of the shortwave spectrum.

There is such a trick and its name is "MCUF" (pronounced "EM cuff") or Most Commonly Used Frequencies. By examining spectrum occupancy data from the past five years, we can pinpoint where a station will *probably* be found.

In an effort to avoid losing listeners, a station will often, when forced to change frequencies, stay as close as possible to an MCUF frequency. So, if a frequency doesn't work right off the bat, try tuning above and below it by 5, 10, maybe even 20 kHz.

When using the MCUF list, remember that not all are on the air at any given time. Some may not be on the air again for months. And, as with all shortwave listening, expect the lower frequencies to work best at night, the higher ones during the day.

There are, of course, some stations with no reliable pattern of repeated frequency usage. Those stations, it seems, choose their spots on the dial with the aid of a roulette wheel. In such cases, we've noted this and added some of the frequencies they currently use.

Afghanistan:

Radio Afghanistan [9]
3965 4450 4740 7200 9635 9755 15255

Albania:

Radio Tirana [1]
5985 6135 6170 6185 6200 7030 7065 7075 7080 7090 7120 7145 7235 7275 7280 7290 7300 7310 9375 9430 9480 9500 9515 9520 9715 9750 9765 9790 10510 11835 11845 11905 11915 11935 11965 11985 15435 16230

Albania:

Radio Gjirokastra [1,2]
5020a 5057

Algeria:

RTV Algerienne
6160 7245 9510 9535 11715 15160 15215 17745

Angola:

Radio Nacional de Angola [1]
3355 6175 7215 7245 9535 9720 11955

Various Regional Stations [1,2,5]
3345 3994 4770 4780 4820 4848 4860 4885 4896 4941 5044 5060 5191 5405 6115 6152 7160 7260 7285 9616

Australia:

Radio Australia
5995 6035 6060 6080 7135 7205 7215 9505 9580 9620 9710 9760 9770 11720 11730 11800 11855 11910 15140 15160 15240 15320 15365 17715 17795

Austria:

Radio Austria International
5945 6000 6155 7170 9770 11665 12015 12015 15270 15410 17745

Schulungssender des Osterreichischen Bundesheeres [2]
3378 5035

Bangladesh:

Radio Bangladesh [4]
4880 6240 7105 7505 9640 9775 9945 11645 12030 13670 15525 17653 21670

Belgium:

Belgische Radio en Televisie (BRT)
5895 5910 6010 9880 11695 11965 15515 15590 17595 21810

Radio-Television Belge de la Communaute Francaise (RTBF) [2]
5965 6050 9900 11660 11785 15210 17675 21460

Benin:

Voice of the Revolution [2]
4870 5025 7190

BROADCASTING

Botswana:

Radio Botswana
3356 4820 5995 7255

Bulgaria:

Radio Sofia
6070 6085 6135 6160 7115 7215 7255 9560 9595 9700 9740 11720 11735 11765 11860 15310 15385

Burkina Faso:

Radio Burkina
4815 7230 9515

Burma:

Burma Broadcasting Service
4725 5985 7185 9730

Cameroon:

Radio Cameroon
4850 4972 6060 7205

Canada:

Radio Canada International
5960 5965 5995 6015 6055 6065 6140 6195 7155 7230 7235 7285 9535 9555 9590 9595 9615 9625 9650 9755 9760 11710 11720 11775 11840 11845 11850 11915 11935 11940 11945 11955 11960 15140 15150 15235 15260 15315 15325 17820 17875

Cape Verde:

Radio Nacional
3931 7155

Central African Republic:

Radio Nationale
5034 7220

Comoros:

Radio Comoro
3331 7260

Cote D'Ivoire (Ivory Coast):

RTV Ivoirenne [4]
6015 7215 11920

Czechoslovakia:

Radio Prague
5930 6055 7345 9505 9600 9605 9630 9740 11855 11990 15110 17705 17840 21505 21705

Denmark:

Danmarks Radio [2,4]
6140 9740 9765 11910 15165 17770 25850

Djibouti:

Djibouti Radio [2]

Egypt:

Radio Cairo [9]
9475 9495 9620 9655 9675 9740 9755 9770 9805 9850 11665 11715 11785 12050 15155 15175 15210 15255 15335 15375 15420 17670 17675 17690 17745 17785 17800 21465

Equatorial Guinea:

Radio Nacional
4925 9553

Ethiopia:

Voice of Revolutionary Ethiopia [9]

Finland:

Radio Finland
6120 11755 15265 15400 21475

France:

Radio France International
3965 5990 6045 6140 6175 7135 7160 7280 9550 9715 9790 9800 9800 9805 9810 11705 11730 11790 11800 11845 11930 11955 11965 11995 15155 15180 15190 15200 15300 15315 15330 15425 15435 17720 17850 17865 21620 25820

Gabon:

Afrique Numero Un
4830 7200 11940 15200 15475 17870

RTV Gabonaise
4777 7270

Deutsche Welle studios are located in this modern skyscraper in Cologne.

Germany (Federal Republic):

Bayerischer Rundfunk [2,5]
6085

Deutsche Welle
3995 5960 5995 6000 6025 6040 6065 6075 6085 6100 6120 6130 6140 6145 6155 6160 6185 7105 7130 7150 7175 7225 7235 7265 7275 7285 9545 9565 9585 9605 9610 9615 9615 9625 9640 9650 9680 9690 9700 9715 9735 9750 9765 9770 11705 11765 11785 11795 11810 11855 11865 11905 11965 15105 15120 15135 15185 15205 15245 15275 15320 15410 17715 17765 17780 21500 21560 21590 21650 21680

Radio in the American Sector (RIAS) [2,5]
6005

Radio Free Europe/Radio Liberty [2]
3990 5985 6070 6105 6115 6135 6170 7115 7145 7165 7190 7200 7255 9505 9540 9565 9695 9705 9725 11725 11770 11825 11855 11875 11895 15145 15170 15215 15255 15340 15355 17735 17760 17770 17805 17835 21455 21530 21665 21720

Sender Freies Berlin [2,5]
6190

Sudwestfunk [2,5]
7265

Germany (Democratic Republic):

Radio Berlin International
6010 6040 6070 6080 6115 7185 7260 9560 9665 9730 9770 11785 11890 15240 15255 15450 17755 21540

Stimme der DDR [2]
6115

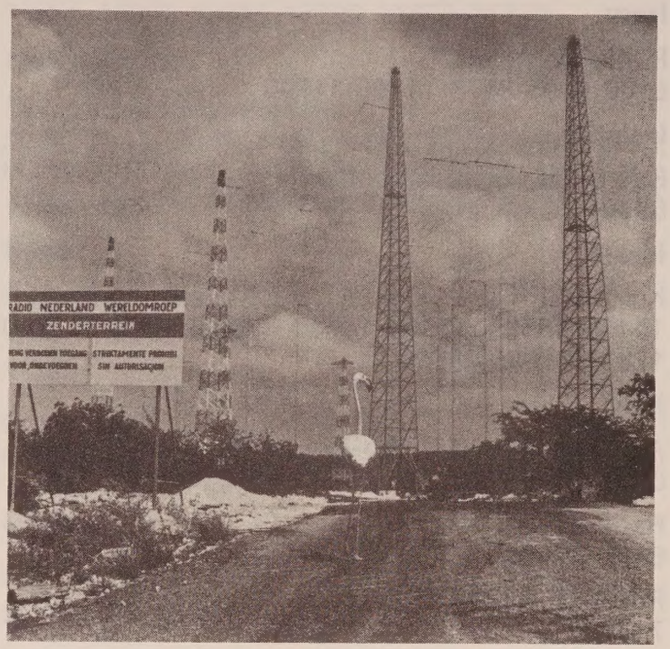
Ghana:

Ghana Broadcasting Broadcasting Corp.
3366 4915 7295

Radio Ghana
6130

Great Britain:

BBC [10]
3995, 3975, 5965, 5975, 5990, 6010, 6015, 6030, 6045, 6050, 6060, 6085, 6100, 6110, 6125, 6140, 6150, 6185, 6195, 7105, 7120, 7125, 7130, 7150, 7155, 7170, 7175, 7185, 7210, 7230, 7255, 7260, 7270, 7320, 7325, 9410, 9530, 9565, 9575, 9600, 9610, 9635, 9660, 9750, 9760, 9770, 9825, 9915, 11680, 11780, 11835, 12040, 12095, 15070, 15115, 15180, 15205, 15235, 15390, 17695, 17705, 17790, 17810, 17855, 18080, 21640, 21710



Radio Netherland's installation on Bonaire Island

Greece:

9420 9865 11645 15630 17565

Guinea:

Voice of the Revolution
6155 7125 9650 15310

Hungary:

6025 6110 7155 7165 7225 9585 9835 11910 12000 15160 15220 17710 21525

Iceland:

Rikisutvarpid [3,4]
9985 11855 13759a 13775 13797

India:

All India Radio
3295 3905 4860 6035 6105 6155 6160 7110 7120 7140 7150 7195 7215 7225 7255 9545 9550 9595 9610 9615 9630 9675 9730 9755 9910 11620 11715 11765 11795 11810 11830 11865 11895 15110 15365 17387 17780 17785 17805 17830 17855 17875

Indonesia:

Voice of Indonesia
11790 15150

Iran:

Voice of the Islamic Republic of Iran
3775 6150 7215 7230 9022 9765 11790 15084 15315

Iraq:

Radio Baghdad [4]
6100 6195 9875 11705 11790

Ireland:

Radio Dublin International [5,6]
6910

Israel:

Kol Israel [9]
15485 15585 15615 15640 17555 17630 17710 17815 21625 25640

Italy:

Adventist World Radio [4]
6185 6205 7135 7215 9605 9670 11770

Radio Uno
6090 9515a

Radio Due [2,5]
7175

Radio Tre [2,5]
3995

RAI (Radiotelevisione Italiana)
5990 6050 6165 7235 7275 7290 9575 9585 9710 11800 11810 11905 15245 15330 15385 17715 17780 21610

Japan:

Radio Japan
5960 6080 6120 7140 9525 9570 9645 9645 9675 11840 11875 11955 15195 15230 15350 17755 17810 17785 21625

Jordan:

Radio Jordan
7155 9530 9560 11920

Kampuchea:

Voice of the People of Kampuchea
9695 11938

Kenya:

Voice of Kenya
6045 6100 7270

Korea (North):

Radio Pyongyang
3015 6165 6540 6576 7230 7290 9505 9530 9655 9715 9750 9977 11660 11780 11830 15140 15160 15180 15340

Korea (South):

Radio Korea
5975 6060 6135 6480 7275 7550 9570 9640 9750 9870 11725 15395 15575

Kuwait:

Radio Kuwait
6055 7120 9750 9840 9880 11675 11990 15345 15495 15505 17850 17885 17895

Laos:

Lao National Radio
7112

Lesotho:

Radio Lesotho [5]
4800

Liberia:

ELWA
6070 9550 11830 11860

Libya:

Radio Jamahiriya [4,9]
6155 6185 7245 9600 9890 15235 15415 15450 17895

Luxembourg:

Radio Luxembourg
6090 15350

Madagascar:

Radio Madagasikara [4]
5010 6135 9690

Malawi:

Malawi Broadcasting Service [5]
5995

Malaysia:

Voice of Malaysia
4845 5965 6025 6100 6175 7295 9515 9665 9750 11900 15295

Malta:

Radio Mediterranean
6110

Monaco:

Trans World Radio [4]
7160 7205 7235 9475 9495 9775 11695 11705 11715

Mongolia:

Radio Ulan Bator
7235 9575 9595 9615 12015 15305 17790

Netherlands:

Radio Netherlands
5955 6020 6050 7285 9520 9540 9590 9630 9770 9895 11730 11735 11740 11930 11935 15315 15560 15570 17605 21475 21480 21685

Nepal:

Radio Nepal
3245a 5005 7165[a] 9590

New Caledonia:

RFO New Caledonia
3355a 7170 11710

New Zealand:

Radio New Zealand International [4]
11780 11960 15150 17705

Norway:

Radio Norway International
6015 6030 7210 7235 9525 9590 9675 11850 11860 11870 15165 15180 17840 21700 21725 21730

Oman:

Radio Oman
6085 7270 9735 15385

Poland:

Radio Polonia
5995 6095 6135 7125 7145 7270 7285 9525 9540 9675 11815 11840 15120 17865

Portugal:

Radio Portugal [4]
6095 9600 9740 11800 11840 15250 15285 21700

Radio Renascenca [2]
9575 9600 9680 11730

Qatar:

Qatar Broadcasting Service
9905 11820 17830 17910

Romania:

Radio Bucharest
5990 6155 6190 7175 7195 7225 9510 9590 9625 9685 9690 11775 11790 11810 11830 11840 11885 11940 15250 15335 15365 15380 17720 17745 17790 17850 21665

Saudi Arabia:

Broadcasting Service of the Kingdom of Saudi Arabia 9
5875 7145 7195 7210 7225 9705 9720 9885 11730 11910 15060 15140 15245 15345 15435 17740 21495

Spain:

Spanish Foreign Radio
6125 7105 9360 9530 9570 9630 9650 9675 11730 11880 11920 11945 15365 15395 17845 17890 21575

Sweden:

Radio Sweden International
6065 9605 9615 9630 9695 9730 11705 11845 11955 15390 15435 17790 21555 21610

Switzerland:

Swiss Radio International
3985, 5965, 6035, 6135, 6165, 6190, 9535, 9560, 9625, 9665, 9670, 9725, 9870, 9885, 11795, 11840, 11905, 11935, 11955, 12030, 12035, 15430, 15570

Syria:

Radio Damascus [7]
9905 12085 15020

Tahiti:

Radio Tahiti
6135 6135 9750 9750 9688a 11825 11825 15170 15170

Taiwan:

Voice of Asia
5980 7285 7445

Voice of Free China
5980 5985 6065 6155 7130 7285 7355 9510 9555 9575 9610 9680 9765 9845 9852 11740 11745 11805 11825 11860 11885 11915 15270 15345 15370 15440 17720 17845

Turkey:

Voice of Turkey [4]
7135 7215 7225 9505 9560 9660 9670 11955 15220 17760

United Arab Emirates:

Voice of the United Arab Emirates - Abu Dhabi [7]
4905 5960 7215 9695

UAE Radio-Dubai
9550 9595 11730 11940 11955 15300 15435 17775 17830 21605 21700

United States:

KGEI
9615 15280

KVOH [7]
6005 9525.5 11930 17775

Voice of America
5995 6020 6080 6130 6190 9530 9565 9575 9650 9670 11580 11715 11890 11895 15160 15195 15205 15265 15400 15410 15415 17640 17710 17740 17785 21580 21610

WINB [7]
15145 15185 15400

WHRI [7]
5995 6000 6010 6100 6155 7355 7400 9580 9770 11770 11980 15105

WMLK [7]
9455 15110

WRNO [7]
6155 6185 7355 11705 15420

Yemen, Arab Republic:

Radio San'a
4853 6135 9780

Yemen, People's Democratic Republic:

Democratic Yemen Broadcasting Service
5970 6005 7190 11770 11950

Yugoslavia:

Radio Yugoslavia
6100 7200 7240 9505 9620 11735 15240

Legend

1 Some frequencies vary up to 10 kHz.
2 No English language broadcasts.
3 Transmissions are in SSB.
4 No or little reliable pattern of frequency usage. List may include current frequency usage.
5 Stable, single frequency station(s).
6 Pirate or quasi-legal station.
7 Station less than five years old. Unable to establish pattern of regular frequency use. Listing may include current frequencies.
8 Station not on air at press time. Proposed frequency usage.
9 Includes other external and/or domestic service programs.
10 Does not include relays.
a alternate frequency

Broadcast Auxiliary

This short range AM service allows up to 100 watts power into a 5-foot antenna for pickup by remote news crews.

Freq kHz:	1606	1622	1646

Travelers Information Service

In an effort to advise tourists of both points of interest and road hazards, the FCC has provided two frequencies adjacent to the standard AM broadcast band for low power roadside transmitters: 530 and 1610 kHz.

Virtually all of these taped-message broadcasts will be heard near national parks, historical sites and highway construction.

World Time Zones

Due to the international characteristic of shortwave broadcasting and communications, 24 hour time is used universally. Beginning with midnight being 0000 hours, noon becomes 1200, 1 PM is 1300, and so forth until midnight--2400 hours--reverts to 0000 again.

Based upon the prime meridian (0^{o} longitude) which passes through Greenwich, England (thus, the former references to Greenwich Mean Time -- GMT), all world time zones are measured from this reference. Since there are 24 time zones, each is separated by 15^{o}, accounting for the 360^{o} of the globe.

In the United States, Eastern Standard Time is 5 hours behind Greenwich (now called Universal Coordinated Time --UTC); our east coast must add 5 hours to its local time to get UTC. As we progress westward we add 6 hours for Central, 7 hours for Mountain, and 8 hours for Pacific Standard Time.

During the summer, those areas which have switched to daylight savings time reduce the difference by one hour since clocks have been set ahead by that amount.

The following table, using EST as a starting point, shows world time conversions to various countries of interest to the SWL.

Country	EST Time
Algeria	6
American Samoa	-6
Andorra	6
Argentina	2
Aruba	1
Ascension Island	5
Australia	15
Austria	6
Bahrain	8
Bangladesh	11
Belgium	6
Belize	-1
Benin	6
Bolivia	1
Brazil	2
Brunei	13
Bulgaria	7
Cameroon	6

Chile	1
China (People's Rep.)	13
Colombia	0
Costa Rica	-1
Cyprus	7
Czechoslovakia	6
Denmark	6
Ecuador	0
Egypt	7
El Salvador	-1
Ethiopia	8
Fiji	17
Finland	7
France	6
French Antilles	1
French Guiana	2
French Polynesia	-5
Gabon	6
Gambia	5
German Dem. Rep.	6
Germany (FR)	6
Gibraltar	6
Greece	7
Guadeloupe	1
Guam	15
Guantanamo Bay (US Naval Base)	0
Guatemala	-1
Guyana	2
Haiti	0
Honduras	-1
Hong Kong	13
Hungary	6
Iceland	5
India	10 1/2
Indonesia	12
Iran	8 1/2
Ireland	5
Israel	7
Italy	6
Ivory Coast	5
Japan	14
Jordan	7
Kenya	8
Korea, Rep. of	14
Kuwait	8
Lesotho	7
Liberia	5
Libya	7
Liechtenstein	6
Luxembourg	6
Macao	13
Malawi	7
Malaysia	13
Monaco	6
Morocco	5
Namibia	7
Netherlands	6
Netherlands Antilles	1
New Caledonia	16
New Zealand	17
Nicaragua	-1
Nigeria	6
Norway	6
Oman	9
Pakistan	10
Panama	0
Papua New Guinea	15
Paraguay	1
Peru	0
Phillippines	13
Poland	6
Portugal	5
Qatar	9
Romania	7
Saipan	15
San Marino	6
Saudi Arabia	8
Senegal	5
Singapore	13
South Africa	7
Spain	6
Sri Lanka	10 1/2
St. Pierre & Miquelon	2
Suriname	1 1/2
Swaziland	7
Sweden	6
Switzerland	6
Taiwan	13
Tanzania	8
Thailand	12
Togo	5
Tunisia	6
Turkey	8
Uganda	8
United Arab Emirates	9
United Kingdom	5
Uruguay	2
Vatican City	6
Venezuela	1
Yemen Arab Republic	8
Yugoslavia	6
Zaire	6
Zambia	7
Zimbabwe	7
Caribbean/Atlantic	
Anguilla, British Virgin Islands, Union Island	1
Autiqua, Barbados, Bequia, Dominica, Montserrat, Muslique, Nevis, Palm Island, St. Kitts, St. Lucia, St. Vincent, Trinidad, Tobago	1

Bahamas	0
Bermuda	1
Cayman Islands,	
Dominican Republic	0
Jamaica	0

Unlicensed Broadcasters

A Special Feature by John Santosuosso

What they are

Legally there is no difference between a pirate and a clandestine broadcaster. Both operate without a license. However, those stations normally referred to as clandestine are openly political and usually have as their objective the over throw of an existing government, or the independence of an unhappy minority. Most are operated by organized revolutionary or resistance groups. In rare instances a few clandestines have managed to obtain licenses to broadcast from neutral or sympathetic countries.

Black clandestines are stations intended to deceive. They are usually established by an unfriendly outside government rather than by domestic political opponents, although they may appear to speak for such groups. The purpose of the stations is to confuse and demoralize the enemy, and if possible to encourage defections.

The term pirate is usually applied to those stations established by radio hobbyists who simply enjoy broadcasting. A few of the hobby pirates have been rather politically oriented in their programming, but the vast majority prefer music and comedy.

Some pirates claim they are completely nonpolitical. Although the siutation could change, at present some European countries (such as Ireland and Italy) tolerate unlicensed broadcasting within certain limitations.

When and where to listen

Because they are illegal, most pirates and clandestines must maintain irregular schedules. Changes in frequency are also common. In the case of clandestines these may even take place during a transmission in order to avoid jamming.

Fortunately, many of the broadcasters do fall into particular patterns, which can make it somewhat easier for the monitor to hear them. Let's take a look at some typical times.

Latin American clandestines are best heard during evening hours in North America from 0000 to 0600 GMT. Some of those in Central America may often be found in the early morning hours after about 1100 GMT. **Far Eastern** clandestines can also be logged during this same morning period.

The best time to hear **North American** pirates is on weekends, especially GMT Sunday after 0400 or 0500. During the winter months, if conditions are ideal, **European** pirates may occasionally be heard testing to North America after 0500 to as late as 0800 GMT.

North American pirate activity often peaks around major holidays such as Thanksgiving, Christmas, New Years Day, Independence Day, and even Halloween. Most stations sign on at the beginning of the hour.

While there are exceptions, pirates tend to use specific bands for their trans missions. In recent years the most popular has included those frequencies between 7350 and 7480 kilohertz. This one has also been favored by some anti-Castro clandestines.

Another band, especially popular in Europe, falls between 6200 and 6300. Some activity may also be found between 3400-34800 and 6900-7000, while a search between 14450 and 15100 may turn up an occasional pirate, especially on weekend afternoons.

Those in major metropolitan areas may find it profitable to monitor 1615-1630 kilohertz medium wave and between 88 and 92 megahertz on the FM band. Pirates seeking a local audience can sometimes be found here.

Clandestine activity is somewhat less clustered; however, frequencies between 6800 and 7100 will often yield Central American clandestines. Those between 6990 and 7100 may still contain an occasional anti-Castro broadcaster, but not in the great numbers of a few years ago.

A search of frequencies outside the regular international broadcast bands may produce some clandestine activity. A few stations deliberately seek frequencies near those used by the governments they oppose.

The language problem

Practically all the European pirates likely to be heard in North America will broadcast some English, at least an occasional station identification. In fact, English seems to be the nearly-universal language of pirate shortwave broad casters.

With clandestines, English is much less common. If

the listener will carefully note key names of persons and places (which sound nearly the same in any language) he will discover that considerable information can still be obtained. The language barrier need not be an obstacle to enjoying clandestine transmissions.

Recently Logged Pirate and Clandestine Broadcasters

558 & 963	Radio Caroline; on SS. Ross Revenge off SE coast of England
1520	Radio Liberacion (contra); nights
1620	Various U.S. pirates
3420	Psilocybin Radio 0150
4420	Voice of the Crusader (anti-Khomeni); 0300
5890	La Voz de UNO (United Nicaraguan Opposition); mornings, evenings
5890	Radio Liberacion Onda Corta (anti-Sandinista); 0145
6215	Radio Quince de Septiembre (contras); 2100-2200
6230	Radio Monimbo (contras)
6610	Radio Farabundo Marti (anti-El Salvador)
6910	Radio Dublin; (anti-England); 24 hrs
6950	La Voz Popular (anti-Guatemala); 0015 Sat
7437	Radio North Coast International; 2150
7445	KNBS ("Cannabis 41") (pro-marijuana); 0005
9960	Radio Caiman
10870	Radio Iran Toilers; (anti-Khomeni); 1530

The following is a list of U.S. pirate mail drops and the stations they serve.

P.O. Box 5074
Hilo, Hawaii 96720:
KFAT, KQSB, WKUE, WYMN, WQTU, Secret Mountain Laboratory, Tangerine Radio, Medieval Radio, Radio Ohm, Radio USA, Union City Radio, The Voice of Bob, The Voice of the Rainbow, Radio North Coast International.

P.O. Box 982
Battle Creek, Michigan 49016:
KNBS, KTGR, Radio America, Radio Clandestine, Razorback Radio, The Voice of Laryngitis, The Voice of Democracy, WCPU-Silicon Valley Radio, WPBR-Pig Boy Radio.

P.O. Box 245
Moorehead, Minnesota 56560:
KROK, Radio Nova, WDX, WMTV, Zeppelin Radio Worldwide.

P.O. Box 40554
Washington, D.C. 20016:
Pirate Radio New England, Radio Bag, Radio Lymph Node International, WBST.

P.O. Box 20039
Ferndale, Michigan 48220:
The Voice of Tomorrow

Most of the stations on this list, when sent an accurate, complete reception report with the proper return postage, will send a QSL.

RADIO DUBLIN
INTERNATIONAL
Q.S.L.
1250 KHz
1188 KHz
6910 KHz
90.2 MHz
TO Scott
Or U.S.A
We are pleased to confirm your reception report of Radio Dublin on 6910 KHz between 0247 and 0325 G M T on the 23/4/84
Studios 58, INCHICORE ROAD, DUBLIN 8 (Visitors welcome)
Mailing Address: RADIO DUBLIN, DUBLIN 8, IRELAND.
Telephone: 01-758684

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Longwave Monitoring

The VLF spectrum, loosely used to refer to all frequencies below the 530 kHz AM broadcast band, is neglected by most listeners even though general coverage receivers are equipped to listen down to at least 100 kHz.

We are indebted to Ken Stryker and the Longwave Club of America for their contributions to monitoring the low frequency spectrum and for their support of this section of the *Shortwave Directory*.

Experimenters and listeners who wish to learn more about the low frequencies may wish to acquire Ken Cornell's and Joe Woodlock's *Aero/Narine Beacon Guide* ($10 postpaid from Ken Stryker, 2856 G West Touhy Avenue, Chicago, IL 60645) or join LWCA ($10 per year includes monthly copies of *The Lowdown*, LWCA's magazine; 45 Wildflower Road, Levittown, PA 19057).

Longwave Frequency Allocations in U.S.

Band (kHz)	Service*
Below 10	Not allocated
10-14	Radionavigation (Omega)
14-19.94	Fixed
19.95-20.05	Standard frequency (WWVL 20 kHz no longer in service)
59-61	Standard frequency (WWVB 60 kHz)
70-90	Fixed; radiolocation
90-110	Radionavigation (Loran C 100 kHz)
110-130	Fixed-maritime mobile; radiolocation
130-160	Fixed; maritime mobile
160-190	Fixed (1750 meter band)
190-200	Aeronautical radionavigation
200-275	Aeronautical radionavigation; aeronautical mobile
275-285	Aeronautical & maritime radionavigation; aeronautical mobile
285-325	Maritime radionavigation
325-335	Aeronautical & maritime radionavigation; aeronautical mobile
335-405	Aeronautical radionavigation; aeronautical mobile
405-515	Maritime radionavigation (410 kHz radio direction finding); aeronautical radionavigation; aeronautical mobile
415-490	Maritime mobile (coast & ship telegraphy)
490-510	Mobile (500 kHz distress and calling)
510-525	Aeronautical & maritime radionavigation; (also 512 kHz ship calling)
525-535	Travelers information (530 kHz)

* "Fixed": land-based US military transmitters.
"Mobile": marine, air or land vehicles
"Radionavigation": radio beacons

Longwave Loggings

The following list comprises actual loggings of stations on the air as heard by LWCA members. Corrections and additions from listeners are welcome.

Freq/kHz	ID	Location	Remarks
.076		Clam Lake, Wisconsin	Navy ELF System
10.2	OMEGA		Common frequency
11.05	OMEGA		Common frequency
11.33	OMEGA		Common frequency
11.8	OMEGA	Haiku, Hawaii	

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11.905	ALPHA	USSR	
12.0	OMEGA	Monrovia, Liberia	
12.1	OMEGA	Aldra, Norway	
12.3	OMEGA	La Reunion Is	
12.649	ALPHA	USSR	
12.8	OMEGA	Tsusshima, Japan	
12.9	OMEGA	Gulfo Nuevo, Argentina	
13.0	OMEGA	Australia	
13.1	OMEGA	LaMoure, North Dakota, USA	
13.6	OMEGA		Common frequency
14.881	ALPHA	Krasnodar, USSR	
15.1	HWU	Leblanc, France	FSK
16.0	GBR	Rugby, England	
16.7	JXZ	Oslo, Norway	Kolsaas Naval Base
16.8	FTA2	St. Arisse, France	Multiplex RTTY
17.1	UMS	Moscow, USSR	Time signal
18.5	DHO38	West Germany	CW
19.0	GQD	Anthorn, England	
19.0	G33DG		NATO identifier of GQD
19.6	GBZ	Criggion, Wales FSK	
20.0	???	???	FSK
20.5	UTR3	Gorki, USSR	
	UQC3	Khabarovsk, USSR	
	UNW3	Estonia, USSR	All time signal stations
	UPD8	Murmansk, USSR	
	USB2	Bielorussia	
21.1	3SB	China, P.Republic	
21.4	NSS	Annapolis, MD	U.S. Navy MSK
22.3	NWC	Exmouth, Australia	U.S. Navy MSK 1000 kW
23.0	Same as 20.5		
23.1			TACOMO aircraft
23.4	NPM	Lualualue, Hawaii	U.S. Navy MSK 630 kW
24.0	NAA	Cutler, Maine	U.S. Navy MSK
24.8	NLK	Jim Creek, Washington	U.S. Navy MSK 130 kW
25.0	Same as 20.5		
25.1	Same as 20.5		
25.5	Same as 20.5		
25.8	???	???	FSK
26.1			TACOMO aircraft
26.5	???	???	FSK
27.1			TACOMO aircraft
27.9	3SV	China, P.Republic	
28.5	NAU	Aguada, Puerto Rico	U.S. Navy MSK 100 kW
37.2		Hawes, CA	U.S. Navy MSK
38.0	OJG	Kemi, Finland	
40.0	JJF2	Tokyo, Japan	CW
40.0	JG2AS	Chiba, Japan	Time signal 10 kw
42.25	NRK	Keflavik, Iceland	U.S. Navy (JASON)
44.0	VIH/VIX	Belconnen, Canberra, AUS	RTTY
44.0			USAF Airborne Command Post
48.5	FXL	Silver Creek, Nebraska	Strategic Air Command MSK 110 kW
50.0	OMA	Liblice, Czechoslovakia	Time signal
50.0	RTZ	Irkutsk, USSR	Time signal
51.6	NSS	Annapolis, Maryland	
53.0	NPL	Chollis Heights, CA	U.S. Navy MSK
53.6	RTO	Moscow, USSR	Fax Weather
54.05	NAM	Driver, Virginia	U.S. Navy (JASON)
55.25	DCF55	Frankfurt, W. Germany	RTTY 75 Bd 0600-1100 UTC News

55.5	???	CA?	MSK
55.5	GXH	Thurso, Scotland	Royal Navy FSK
56.5	???		MSK
57.8/.9	???		FSK
58.7		Ft. Ritchie, MD	Alternate Natl. Mil. Command Center
59.0	NGR	Greece	U.S. Navy MSK
60.0	WWVB	Fort Collins, Colorado	Time signal 13 kW
60.0	MSF	Rugby, England	Time signal
61.8	GIZ	London, England	Royal Navy
62.6	FTA	Paris, France	French Navy
66.66	RBU	Moscow, USSR	Time signal
73.6	CFH	Halifax, Nova Scotia	FSK
75.0	HBG	Prangins, Switzerland	Time signal 20 kW
76.2	CKN	Vancouver, British Col.	FSK
77.15	NAM	Driver, Virginia	U.S. Navy (JASON)
77.5	DCF77	Mainflingen, W. Germany	Time signal
80.05	GXH	Thurso, Scotland	Royal Navy backup for 55.5
81.0	MKL	Pitreavie, Scotland	RAF
83.1	OFA83	Helsinki, Finland	FAX weather
83.8	FTA83	St.Andre de Corcy, France	CW 45 kW
88.0	NSS	Annapolis, Maryland	U.S. Navy MSK
100.0	LORAN C	Various	Navigational System
106.7	OLT22	Prague, Czechoslovakia	Fax weather
110.0	DPA	Germany	RTTY
110.6	DCF30	Hamburg, W. Germany	
111.3	SOA211	Warsaw, Poland	RTTY Weather 0618+1827 UTC
111.8	OLT21	Prague, Czechoslovakia	
112.15	CII	Shilo, Manitoba	Can Dept Nat Def FSK 3 kW
113.2	VER	Ottawa, Ontario	Can Dept Nat Def FSK 3 kW
117.4	DCF37	Offenbach, W. Germany	Fax weather
119.0	IDR	Rome, Italy	CW
119.15	CII	Shilo, Manitoba	Can Dept Nat Def FSK 3 kW
119.15	ZRH	Cape Naval, S.Africa	RTTY weather
119.85	SAY	Norrkoping, Sweden	Fax weather
120.0	SXA	Spata Attikins, Greece	CW
122.2	OUA23	Fredrikshaven, Denmark	'V' Marker
122.3	CIF	Borden, Ontario	Can Dept Nat Def FSK 3 kW
122.5	CFH	Halifax, Nova Scotia	CW weather
122.65	JMC	Tokyo, Japan	CW weather
123.0	VEN	Nanaimo, B.C.	Can Dept Nat Def FSK 3 kW
124.0	CKN	Vancouver, B.C.	CW weather
125.2	SLZ1	Sweden	Fax weather
125.8	CII	Shilo, Manitoba	Can Dept Nat Def FSK 10 kW
128.3	VDD	Debert, Nova Scotia	Can Dept Nat Def FSK 3 kW
128.3	VEX	Penhold, Alberta	Can Dept Nat Def FSK 3 kW
129.5	SOA212	Warsaw, Poland	Meteo 1825-0923 UTC weather
131.4	VEV	Valcartier, Quebec	Can Dept Nat Def FSK 3 kW
131.8	FYA31	Paris, France	Fax weather
133.15	CFH	Halifax, Nova Scotia	FSK
133.15	CKN	Vancouver, B.C.	FSK RTTY 25 kW
133.85	CII	Shilo, Manitoba	Can Dept Nat Def FSK 10 kW
134.2	DCF54	Offenbach, W. Germany	Fax weather
134.9	NSS	Annapolis, Maryland	U.S. Navy (JASON)
136.0	NPG	Dixon, CA	8 channel FDM RTTY
136.0	TBA	Izmir, Turkey	CW
136.3	VEV	Valcartier, Quebec	Can Dept Nat Def FSK 3 kW
136.8	???	???	RTTY
139.0	DCF39	Frankfurt, W. Germany	Fax weather

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139.1	VEV	Valcartier, Quebec	Can Dept Nat Def FSK 3 kW
139.5	CIF	Borden, Ontario	Can Dept Nat Def FSK 3 kW
140.3	DCF60	Frankfurt, W. Germany	
140.5	VER	Ottawa, Ontario	Can Dept Nat Def FSK 3 kW
142.25	TFK	Keflavic, Iceland	U.S. Navy (JASON)
142.86	UIK	Vladivostok, USSR	CW weather
143.5	VDD	Debert, Nova Scotia	Can Dept Nat Def FSK 3 kW
146.0	Y7A20	E. Berlin, E. Germany	100 Bd RTTY
147.2	DDH47	Pinneberg, W. Germany	CW weather
148.55	VER	Ottawa, Ontario	Can Dept Nat Def FSK 3 kW
162.0	VEX	Penhold, Alberta	Can Dept Nat Def FSK 3 kW
168.0	CIF	Borden, Ontario	Can Dept Nat Def FSK 3 kW
168.0	VEX	Penhold, Alberta	Can Dept Nat Def FSK 3 kW
174.0	VDD	Debert, Nova Scotia	Can Dept Nat Def FSK 3 kW
174.0	VER	Ottawa, Ontario	Can Dept Nat Def encrypted FSK RTTY 10 kW
183.0	CIF	Borden, Ontario	Can Dept Nat Def encrypted FSK RTTY 10 kW
187.0	VEV	Valcartier, Quebec	Can Dept Nat Def FSK 3 kW
193.0	CII	Shilo, Manitoba	Can Dept Nat Def FSK 3 kW
197.5	VER	Ottawa, Ontario	Can Dept Nat Def FSK 3 kW

Between approximately 160 to 190 kHz--the domain of wireless intercoms and license-free, 1750 meter experimenters--are heard rapidly-pulsating, line-load telemetry signals, a carrier-current system used by electric power generating companies to adjust to consumer demands.

Eventually, some 150 Ground Wave Emergency Network (GWEN) sites across the country will join the Survivable Low Frequency Communications Sytem (SLFCS), heard between 150-180 kHz as encrypted FSK signals similar to packet radio. Transmitting individually approximately every 5-10 seconds, the transmitters all come on in unison about every 20 minutes.

Abbreviations, Acronyms and Code Names

AABNCP	Advanced Airborne National Command Post
AACOMS	Army Area Communications System
AAF	Army Air Field
AB	Air Base
ABCCC	Airborne Battlefield Command and Control Center
A/C	Aircraft
ACD	Automatic Call Distribution System
Ace High	Tropospheric Scatter Communications Network (NATO)
ACLICS	Airborne Communications Location Identification and Collection System
ADSAF	Automatic Data System for the Army in the Field
ADSCOM	Advanced Ship Communications
ADT	Airborne Data Terminal
AF	Air force
AFB	Air Force base
AFCC	Air Force Communications Center
AFRES	Air Force Reserve
AFSATCOM	Air Force Satellite Communications
ALCC	Airlift Control Center
ALLOC	Allocation
AM	Amplitude modulation (full carrier).
AMTOR	Amateur radio TOR
AMVER	Automated Merchant Vessel Rescue system.
ANDVT	Advanced Narrow-band Digital Voice Terminal
ANG	Air National Guard
ANGB	Air National Guard Base
ANGS	Air National Guard Station
ANT	Antenna
APACHE	Analysis of Pacific Area Communications for Hardening to EMP
ARPANET	Packet Switched Data Communications Network
ARPT	Airport
ARQ	Automatic request
ARRS	Aerospace Rescue and Recovery Service
ARS	Air Refueling Squadron
ARTADS	Army Tactical Data System
ARTCC	Air Route Traffic Control Center
AS	Air Station
ASCL	Advanced Sonarbuoy Communications Link
ASCON	Automatic Switched Communications Network
ASW	Anti-Submarine Warfare
ATACS	Army Tactical Communications System
ATC	Air Traffic Control or Air Training Command
ATDS	Airborne Tactical Data System
ATOS	Air Terminal Operation Service
AUTODIN	Automatic Digital Network
AUTOSEVCOM	Automatic Voice Network
AWACS	Airborne Warning and Control System
Baud (Bd)	Bits of data per second
BC	Broadcast
BCB	Broadcast band
BCI	Broadcast interference
BFO	Beat frequency oscillator
BUG	Semi-automatic key
CALL TAPE	Recorded message sent repeatedly to alert recipient
CAMPS	Computer Assisted Message Processing System (NATO)
CBW	Chemical & Biological Warfare
CCC (C^3)	Command, Control and Communications
CE	Communications equipment
CIC	Commander in Chief
Cifax	Enciphered facsimile
CINCLANT	Commander in Chief, Atlantic
CINCPAC	Commander in Chief, Pacific
CIPHER	Encrypted plain test
Clansman	British Army Tactical Communications Equipment (UK)
Clarinet	Communications Security
CNI	Communications, Navigation and Identification
COE	Corps of Engineers
COMINT	Communications Intelligence
COMMS	Communications
COMMSTA	U.S. Coast Guard communications stations
Compac	Man-portable Satcom Terminal (UK)
COMSEC	Communication Security
COMSTA	Communications Station
CONUS	Continental United States
CQ	General call to anyone monitoring, inviting reply
Crazy Cat	Optical Communications Jamming System
Crazy Dog	Battlefield Communications Jamming System

GLOSSARY

CRITICOM	Critical Intelligence Communications
CS	Communications squadron
CSCG	Communications Security Control Group
CW	Continuous wave (Morse code)
DCA	Defense Communications Agency
DCS	Defense Communications System
DE	(French "from") This is (id or callsign)
DES	Digital Encryption Standard
DSB	Double sideband
DSCS	Defense Satellite Communications System
DTOI	Date and time of intercept.
DX	Distance
EAM	Emergency action messages
ECSS	Exalted carrier single sideband
EMMPS	Enhanced MEECN Message Processing System
EMP	Electromagnetic Pulse (from nuclear detonation)
EOF	Emergency Operating Facility
ERCS	Emergency Rocket Communications System
EUCOM	European Command (NATO)
FACSFAC	U.S. Navy Fleet Area Control and Surveillance Facility
FATT	Forward Area Tactical Teletype
FAX	Facsimile
FCC	Federal Communications Commission
FDM	Frequency division multiplex
FEC	Forward error correcting (radioteletype TOR)
FLTSATCOM	Fleet Satellite Communications
FM	Frequency modulation
FOCAS	Fibre Optical Communications for Aerospace Systems
FSK	Frequency shift keying
FSS	Flight Service Station
GCCS	Global Command and Control System
Giant Talk	Early Warning Airborne HF Communications System
GMT	Greenwich Mean Time (obsolete); see UTC
Green Pine	Early Warning Airborne UHF Communications System
Gryphon	Secure Shore-to-Ship Communications System
GWEN	Ground Wave Emergency Network
H	On the hour.
H+	Minutes past the hour
HEMP	High Altitude Electromagnetic Pulse
HF	High frequency
HFIC	HF Intra-Task Force Communications
HICOM	U.S. Navy High Command Worldwide Voice Network
HQ	Headquarters
HVIT	High Volume Information Transfer
Hydrus	Secure Ship-to-Shore Communications System
Hz	Hertz; unit of frequency (formerly cycles per second).
IAP	International Airport
ICS 3	Integrated Communications System (UK)
ID	Identification
IEMATS	Improved Emergency Message Automation Transmission System
IFSR	International Flight Service
INCA	Integrated Nuclear Communications Assessment
INTACS	Integrated Tactical Communications Study
IRC	International Reply Coupon
IRR	Integrated Radio Room
ISB	Independent sideband
ITU	International Telecommunications Union (Geneva, Switzerland)
IVCS	Integrated Vehicle Communications System
Jaguar	Frequency Hopping Radio System (UK)
JATCCCS	Joint Advanced Tactical C^3 System
JTIDS	Joint Tactical Information Distribution System
JUMP	Joint UHF Modernization Project
kHz	Kilohertz
KW	Kilowatt (1000 watts)
LF	Low frequency
LL	Landline (telephone call)
LORAN-C	Long Range Aid to Navigation
LSB	Lower sideband
M	Meter(s)
MAC	Military Airlift Command
MAG	Military Assistance Group
MAP	Municipal Airport
MARKER	Any continued or repetitive signal sent to keep frequency occupied
MASST	Major Ship Satellite Terminal
MATS	Mobile Automatic Telephone System (Various)
MAW	Military Air Wing

MCAS	Marine Corps Air Station
MCW	Modulated continuous wave
MEDAX	Message Data Exchange Terminal
MEECN	Minimum Essential Emergency Communications Network
METEO	Meteorological (weather)
MF	Medium frequency
MHz	Megahertz
MKR	Channel markers
MM	Maritime mobile
MOMCOMS	Man-on-the-Move Communications System
MPDS	Message Processing and Distribution System
MUF	Maximum usable frequency
MULCAST	Multichannel Broadcast
MULTOTS	Navy Advanced Tactical C^3 Program
MW	Medium wave
Mystic Link	Digital Information Distribution System
Mystic Star	USAF SSB network controlled by Andrews AFB for Air Force 1 and Air Force 2 communications
NAS	Naval Air Station
NASCOM	NASA Communications Network
NAVCOMPARS	Naval Communications Processing and Routing System
NAVCOMSTA	Naval Communications Station
NAVMACS	Naval Modular Automated Communications System
NAVRADSTA	Naval Radio Station
NBSV	Narrow-Band Secure Voice
NCS	Net Control Station
NDB	Non-directional beacon
NEACP	National Emergency Airborne Command Post (pronounced "kneecap")
NFHQ	National Field Headquarters
NG	National Guard
NICS	NATO Integrated Communications System (NATO)
NMCS	National Military Command System
NORAD	North American Aerospace Defense Command
NORATS	Navy Operated Radio and Telephone System
NTDS	Naval Tactical Data System
NTM	Notice to mariners
NUCO	New code; voice advisement that crypto system switches with next series of characters.
NX	News broadcast or transmission
OCCULT	Optical Covert Communications Using Laser Transceivers
OM	"Old man"; male operator
Ops	Operations
PACCS	Post Attack Command and Control System
Piccole	Transmission system whereby signal (Morse code or Telex) is converted into 5 or 6 musical tones (UK)
PCM	Pulse code modulation
PFC	Prepared form card
Pilgrim	Secure Communications Development Program
PMFR	Pacific Missile Firing Range
Pri	Primary Frequency
PT	Plain text
RAF	Royal Air Force (UK)
RAO	Regional Area Office
RCC	Rescue Coordination Center or radio common carrier.
RELOC	Relocation
RF	Radio frequency
RO	Regional Office
RS	Receiver Station
RST	Readability, signal strength, tone quality (CW report).
RTTY	Radioteletype
RX	Receiver
SAC	Strategic Air Command
SACCS	Strategic Air Command Automated Command Control System
SAGE	Semi-Automatic Ground Environment
SAM	Special Air Mission
SAMSON	Strategic Automatic Message Switching Operational Network Submarine/Aircraft Optical Communications System
SAR	Search and Rescue
SARBE	Search and Rescue Beacon Equipment (UK)
SASE	Self addressed stamped envelope
SATIN	Strategic Air Command Automated Total Information Network
SCOT	Shipborne Satcom Terminal (UK)
SDS	Satellite Data System
SEC	Secondary Frequency
SECOM	Secure Communications
Seek Bus	Jam-resistant Digital Tactical Communications System
Seek Talk	Secure Communications System
SFO	Sector Field Office
SHELF	Super Hard ELF System
SICOFAA	System of Cooperation Among the American Air Forces (US & Lat.Am)
SIGINT	Signals Intelligence

GLOSSARY

SINCGARS V	Single Channel Ground and Airborne Radio System VHF
SINPO	(See glossary)
SITFA	Interamerican (Air Forces) HF Voice & RTTY network of SICOFAA (US & Lat.Am.)
SITOR	Commercial version of TOR
SITREP	Situation report
SKED	Schedule
Skynet	British Military Communications Satellite (UK)
SLFCS	Survivable Low Frequency Communications System
SOW	Special Operations Wing
SPANNER	Special Analysis of Net Radio (US Study)
SSB	Single sideband
STARCOM	Strategic Army Communications
STDL	Submarine Tactical Data Link
STFS	Standard Time and Frequency Station
STRATCOM	Strategic Communications
SURVSATCOM	Survivable Satellite Communications System
SW	Shortwave
SWBC	Shortwave broadcasting.
SWL	Shortwave listener
TAC	Tactical Air Command
TACAMO	VLF Airborne Radio Relay System
TACOM	Tactical Area Communications System (FDR)
TACSATCOM	Tactical Satellite Communications
TACTEC	Totally Advanced Communications Technology
TACW	Tactical AirCommand Wing
TAS	Tactical Airlift Squadron
TAW	Tactical Airlift Wing
TCCF	Tactical Communications Control Facility
TDM	Time division multiplexing
TELEX	A teleprinter activated by telephone lines
TES	Transportable Earth Station (UK)
TFC	Traffic communications
TFW	Tactical Fighter Wing
TIS	Travelers Information Station
TOR	"Telex over radio"
TOS	Tactical Operations System
TX	Transmitter
UMIB	Urgent marine information broadcast
USA	US Army
USAF	US Air Force
USAR	US Army Reserve
USB	Upper sideband
USCG	US Coast Guard
USMC	US Marine Corps
USN	US Navy
USNAVFAC	US Naval facility
USP	United States and possessions
UTC	Coordinated Universal Time
Ute	Slang for utilities
Veri	Slang for verification form card
VLF	Very low frequency
VOLMET	French acronym for "flying weather"
WARC	World Administrative Radio Conference
WHCA	White House Communications Agency
WPM	Words per minute (usually referred to in Morse or RTTY)
WRS	Weather Reconnaissance Squadron
WWMCCS	World-wide Military Command and Control System
WX	Weather broadcast
YL	"Young lady"; female operator
Z	"Zulu" time - same as UTC and GMT
#	number(s)
5F (5L)	Five figure (or letter) group

SWL Glossary

addressee	The component or individual to whom a message is directed by the originator.
aeronautical radio-beacon station	A radiobeacon station intended for the benefit of aircraft.
aeronautical station	A land station in the aeronautical mobile service which in certain instances, may be located on board ship or on a platform at sea.
agency	A group such as a government bureau empowered to conduct business activity.
alpha-numeric	Set of symbols consisting of characters and numbers.
amateur service	A radio communication service for the purpose of self-training, intercommunication and technical investigation. (see ham)
amplitude modulation (AM)	Mode of transmission where signal is transmitted by using the audio portion to vary the strength of the carrier wave portion.
antenna	A device for radiating and receiving electromagnetic waves. (see beam, dipole, longwire, loop, whip)
authentication	A security procedure designed to prevent fraudulent transmissions.
band	A portion of the radio frequency spectrum.
band-slip marker	A call-tape transmission, usually in Morse or RTTY ("QRA DE WLO", etc)
bandwidth	The high and low limits of a portion of radio spectrum over which the performance of a device is being measured.
base station	Fixed land station communicating with one or more mobile stations
baud (bd)	Bits of data per second. (45bd=60wpm; 50bd=67wpm; 57bd=75wpm; 75bd=100wpm
Baudot alphabet	A five-unit code applied to teleprinter systems developed by Jean Maurice Emile Baudot. It employs a 32-element alphabet designed particularly for telecommunications wherein each symbol intended for tranmission is represented by a unique arrangement of five mark or space impulses.
beam antenna	Antenna with directional properties, usually driven by a rotor so it can be pointed in any desired direction.
beacon	Station which transmits signal that is used for navigational purposes by ships and aircraft.
beat frequency oscillator (BFO)	Used on radio receivers to permit reception of Morse code, RTTY, FAX, and single sideband voice.
blind	Sending traffic without making contact with the recipient. Messages can be acknowledged at a later time and/or via other means.
break-in procedure	The receiving station will interrupt on the tranmsitting station by sending one or more long dashes. When the transmitting station stops, the receiving station sends the first letter of the group he wants repeated.
broadcasting service	A radio communication service in which the transmissions are intended for direct reception by the general public.
burst	A short signal transmission often containing information sent. Message is at a very fast rate. Often used to avoid interception and site location by direction finding.

GLOSSARY

bury	To conceal or hide certain words, phrases or messages in the text of a communication.
call sign	Any combination of letters and/or numbers, identifying a communications facility, command, authority, activity, or unit.
carrier	The electromagnetic examination from a transmitter which may be modulated with information.
channel	One of a sequenced set of frequencies arranged for convenient selection.
chatter	Casual exchange between operators of a two-way circuit.
cipher	A code.
Citizens Band	A range of 40 frequencies from 26.965-27.4051 MHz allocated to private citizen, short-range communication.
clandestine broadcast	A counter-regime political transmission from an organization that is considered illegal in the target country.
coast station	A land station in the maritime mobile service.
code	A technique to conceal the contents of a transmitted message by rearranging or substituting contents according to a prearranged plan.
code book	A book or document used in a code system, arranged in systematic form, containing units of plain text of varying length (letters, syllables, words, phrases, or sentences) each accompanied by one or more arbitrary groups of symbols used as equivalents in messages.
code test	A formal assessment of a person's skill in receiving and/or transmitting the Morse code at a designated speed.
communication	The transfer of meaningful information from one location to another.
compromise	The availability of classified material to unauthorized persons through loss, theft, capture, recovery by salvage, defections of individuals, unauthorized viewing, or any other physical means.
contact	A successful communication between two stations.
continuous wave (CW)	On-off keying of the carrier waved (used in Morse code)
control	The station located at a headquarters or designated as being in charge of a particular radio net.
Coordinated Universal Time (UTC)	Equivalent to mean solar time at the prime meridian (0 degrees longitude); formerly GMT.
counterpoise	A conductor or system of conductors used as a substitute for the ground in an antenna system.
covert	A concealed or secret relationship.
cryptanalysis	The analysis of encrypted messages and subsequent conversion into plain text without intitial knowledge of the key employed in the encryption.
cryptogram	A communication in visible writing which conveys no intelligible meaning in any known language, or which conveys some meaning other than the real meaning.
cryptography	That branch of cryptology which treats of the means, methods, and apparatus for converting or transforming plain text messages into cryptograms, and for reconverting the cryptograms into their original plain text.

cryptology	That branch of knowledge which treats of hidden, disguised or encrypted communications.
cut numbers	Digits sent in abbreviated fashion. Many different cut number systems are in use throughout the world, ranging from a simple system of only one number being cut (as with zero sent as the letter T), to those with a letter substituted for each of the digits 1-0.
cycle	The time interval for the completion of a periodic function such as the electromagnetic property of a radio wave.
decipher	To convert an enciphered message into its equivalent plain text by a reversal of the cryptographic process used in the encipherment, not by cryptanalysis.
decode	To convert an encoded message into its plain text by means of a code book. (This does not include solution by cryptanalysis.)
decrypt	See decipher.
demodulation	Recovery of original modulator from a modulated radio signal.
deviation	The broadening of an FM signal by modulation.
digraph	A pair of letters.
dinome	A pair of digits.
dipole antenna	A center or off center fed antenna cut to a specific length for a particular band (or bands) of frequencies.
Doppler effect	An apparent change in frequency caused by motion of either the transmitter or the receiver.
double sideband (DSB)	Radio transmission in which both sidebands produced by modulation are transmitted equally.
doublet	A digraph or dinome in which a letter or a digit is repeated (e.g., LL, 22, etc.).
down at ____	Used by intercept operator to indicate time station ceased transmission.
dropped at ____	Used by intercept operator to indicate time of monitoring of target was discontinued.
dummy messages	False messages transmitted as part of a deception program to mislead enemy traffic and crypto analysis efforts.
duplex operation	Simultaneous transmission in both directions of a telecommunication channel by using different frequencies.
DX'er	Individual who listens to distant radio signals; from CW abbreviation "DX" meaning distance.
emission	The waves radiated into space by a transmitter.
encipher	To convert a plain text message into unintelligible language by means of a code book.
end product	Finished intelligence
exalted carrier single sideband (ECSS)	A distortion-reducing technique of tuning in a full-carrier AM signal using the receiver's SSB mode.
facsimile	A process by which pictures or images are scanned and converted into electrical signal waves, then reproduced.
fading	The characteristic of changes in radio wave propagation which causes their received amplitude to decrease.
feeder	A point to point transmission of a radio program to a transmitter site intended for subsequent broadcast.
fixed	A permanent installation.

GLOSSARY

frequency	Symbolized by f, the number of vibrations of electromagnetic energy per second; the unit is the hertz (Hz), formerly cycles per second (cps). Radio frequencies are normally expressed in kilohertz (kHz) below 30,000 kHz, megahertz (MHz) above this frequency, and gigahertz (GHz) above 1,000 MHz.
frequency division multiplex (FDM)	A wideband process for transmitting two or more signals over one frequency band.
frequency modulation (FM)	A carrier wave whose frequency is varied by an amount proportionate to the amplitude of the modulating signal.
garble	An error in transmission reception or encryption which causes words or phrases to be unreadable.
group	A number of digits, letters or characters forming a unit for transmission.
half duplex (semi-duplex)	Transmission on two channels or frequencies, but not simultaneously.
harmonic emission	The unintentional emanation of whole-number multiples of the fundamental (intended) frequency of an oscillator or transmitter, often causing interference to users of those higher frequency services.
hertz	The basic unit of frequency, formerly cycles per second.
ham	A radio amateur. Slang for a licensed radio operator who operates a station as a hobby rather than a business.
high frequency (HF)	Shortwave band 3-30 MHz
identification	Determination of the specific unit (aircraft, ship, land transmitter, etc.), but not necessarily its location.
independent sideband (ISB)	Simultaneous upper and lower sideband, each with different content.
intelligence	The product resulting from collecting and processing information concerning actual or potential situations and conditions relating to criminal activities, enemy-held areas or foreign governments.
intelligence community	The members of the US Intelligence Community are: Central Intelligence Agency, National Security Agency, Defense Intelligence Agency, Bureau of Intelligence and Research of the Department of State, Air Force, Army, Navy and Marine Corps Intelligence elements, Federal Bureau of Investigation, Department of the Treasury, Department of Energy, Department of Defense offices that collect specialized national foreign intelligence through reconnaissance programs, and members of the intelligence community staff.
interception	The process of gaining possession of a communication intended for another without obtaining the consent of the addressee or originator.
interference	The degrading effect of unwanted energy imposed upon reception in a radio communications system.
intermodulation	The generation of spurious signals in a receiving system caused by strong signal overload of the receiver.
international broadcasting	A broadcasting service, employing frequencies between 5950 kHz and 26100 kHz, whose transmissions are intended to be received directly by the general public in foreign countries. In the United

	States, popularly called "world band".
international Morse code	A code widely-used in radio telegraphy in which letters and numbers are represented by specific groupings of dots and dashes.
International Reply Coupon (IRC)	Purchased at post office and used to reimburse a foreign recipient for his postal cost.
intrusion	The intentional insertion of electromagnetic energy into transmission paths, in any manner, with the object of deceiving operators or causing confusion.
ionosphere	Electrically-charged (ionized) outer part of the earth's atmosphere which reflects and refracts (bends) radio waves.
jamming	Transmission set up to intentionally interfere with or disrupt programming on the same or a nearby frequency. Jamming methods include varying tones, buzzing sounds, warbling, etc.
key	A switching device used to send Morse code characters.
link	A communication facility located between two points and used to relay a signal, often automatically.
log	Record kept by radio operators and listeners. The elements of the record are usually date, time, frequency, callsign and any other notations which may be helpful for future reference.
long wire antenna	An end-fed wire antenna longer than one wavelength at the operating frequency.
loop antenna	Closed circuit of one or more turns of wire in the same plane.
low frequency	That portion of the spectrum from 30 kHz to 300 kHz. Sometimes referred to as longwave.
lower sideband (LSB)	The lower of the two frequencies or groups of frequencies produced by the amplitude-modulation process.
marine broadcast station	A coast station which makes scheduled broadcasts of time, meteorological and hydrographic information.
marine radiobeacon station	A radiobeacon station intended to assist ship navigation.
maritime mobile service	A radio service between coast and ship stations, or between ship stations.
mark impulse	An impulse used in teleprinter transmission during which current flows through the teleprinter receiving magnet. The other type of impulse is the space impulse.
marker	A repeated message in Morse code or voice, usually recorded, identifying a station and sometimes listing frequencies in use by the station.
marker beacon	A transmitter in the aeronautical radio navigation service which radiates vertically a distinctive pattern for providing position information to aircraft.
maximum usable frequency (MUF)	The highest frequency that can be used for radio transmissions without having the signal escape through the ionosphere.
meaconing	The deliberate transmission of actual or simlulated radio navigation signals for the purpose of confusing navigation.
medium frequency (MF)	That portion of the spectrum from 300 kHz to 3 MHz, including the standard AM broadcast band.

GLOSSARY

medium wave (MW)	Standard AM broadcast band (540-1600 kHz).
message	Any thought or idea expressed in plain or secret language, prepared in a form suitable for transmission.
meters (m)	The length of one wave of electromagnetic energy passing a point in space.
mike	Popular term for microphone.
mobile station	A radio station installed on a vehicle, ship, plane, automobile, etc.
modulation	Process by which essential characteristics of signal wave are impressed on the carrier wave.
monograph	A single letter
monome	A single digit
Morse code	A code developed by Samuel F.B. Morse which uses patterns of long and short pulses of energy to represent letters, numbers, punctuation and symbols.
multipath	Propagation of radio waves by more than one path from transmitter to receiver; usually causes fading or distortion.
multiplexing	Use of one common channel to make two or more channels, either by dividing the frequency band of common channel into narrower bands (FDM) or by allotting it alternately to different channels (TDM).
net (network)	An organization of radio stations which generally reflects the command structures. The headquarter station is usually in charge of the subordinate stations; this station is called the net control station (NCS) and the others are called outstations. The control station is responsible for the supervision of tranmissions, procedures and circuit discipline.
noise	Any unwanted electrical disturbance or spurious signal which modifies the desired data.
non-directional beacon (NDB)	Low-powered (usually less than 50 watts) sending an identifier in slow Morse code, used for navigational purposes.
OMEGA Navigation System	A low frequency (10-20 kHz) navigation system.
one-time pad	A printed pad with a one-time use key on each page designed to permit the destruction of each page as soon as it is used. An agent in the field may have a pad the size of a postage stamp. Sometimes the pads are called "one-time gammas."
originator	The command by whose authority a message is sent.
other end	The station being called.
overt	Open, without attempt to conceal.
padding	Extraneous text added to a coded message for the purpose of concealing its length, beginning or ending or both.
parasitic emission	A spuriously-generated signal radiated by a transmitter, usually not a harmonic of the fundamental frequency.
permutation table	A table designed for the systematic construction of code groups. It may also be used to correct garbles in groups of code text.
pirates	Unlicensed broadcasting stations often run by electronic hobbyists.
plain text (PT)	Intelligible meaning in the language in which the

	message was written with no hidden meaning.
prepared form card (PFC)	Sent by a DX'er for a station to fill out to confirm his reception report.
probable-word method	The method of solution involving the trial of plain text assumed to be present in a cryptogram.
propagation	Manner in which an electromagnetic emission travels outward from its source.
Q-signals	An abbreviated form used to send frequently repeated questions and answers.
quieting	The suppression of background noise by an FM signal, an indicator of the signal strength.
QSL card	Verification of reception sent by a radio station to acknowledge a reception report from a listener. A verification exchanged by licensed amateurs following a contact.
radiation patterns	The distribution in space of the electromagnetic energy produced by an antenna.
radiobeacon station	A navigation station intended to enable a mobile station to determine its bearing or direction in relation to the radiobeacon station.
radio frequency (RF)	Any frequency at which electromagnetic radiation of energy is possible.
radio wave	Electromagnetic enery moving from its point of radiation at the speed of light and oscillating at radio frequency.
raw traffic	Intercepted traffic before extensive processing for communication(s) intelligence purpose.
read	To decrypt, especially as the result of successful cryptanalysis.
receiver	The person or device to which information is sent over a communication link.
reception report	A report containing information elements of frequency, time, signal strength, call sign and other data describing the transmission so that it can be identified and acknowledged.
relay	A transmission forwarded by way of an intermediate station.
repeater	A combination receiver/-transmitter which retransmits the amplified received signal in real time.
RST system	A numeric rating system for the quality of a received CW signal.
selectivity	The ability of a receiver to discriminate between closely related signals.
sensitivity	Characteristic of receiver which determine minimum usable input, generally expressed in terms of signal-to-noise ratio, microvolts or decibels.
ship station	A mobile station located on board a vessel which is not permanently moored.
shortwave listening	Abbreviated SWL. The monitoring of tranmissions in the 1.6-30 MHz portion of the spectrum.
signal	Purposely-transmitted radio energy intended for reception to convey information or perform a task.
signal-to-noise-ratio	The ratio of the strength of a radio signal to that of the background noise.
simplex operation	Operating method in which two-way transmission is made alternately in each direction on a telecommunication channel or frequency by manual control.

GLOSSARY

single sideband (SSB)	Radio transmission in which either upper or lower sideband is transmitted, but not both.
sliding strip	A strip of cardboard or similar material which bears a sequence and which can be slid against other such strips to various juxtapositions to encode or decode a crypto message. Also known as the "St. Cyr Slide" after the French military school at which it was developed.
space impulse	An impulse used in teleprinter transmission during which no current flows through the teleprinter receiving magnet. The other type of impulse is the mark impulse.
spread spectrum	Frequency hopping technique which decreases interference to other users while achieving privacy. Normally narrowband information is spread over a relatively wide band of frequencies. The receiver correlates the signal to retrieve the original information signal.
spurious emission	Undesirable and incidental emission on frequencies outside the necessary bandwidth to convey information. Spurious emissions include harmonics, parasitics, intermodulation products, frequency conversion products, but exclude out-of-band emissions.
squirt transmission	Generally a twenty-second burst of apparent noise which, when decoded, will contain twenty minutes of information.
standard time and frequency station (STFS)	Transmits precise time signals on precise frequencies.
substitution system	A system in which the elements of the plain or code text are replaced by other elements for the purpose of encryption.
sunspots	Cooler spots on the surface of the sun which indirectly produce magnetic and radio propagation disturbances on the earth.
telecommunication	Any transmission or reception of intelligence by wire, radio, optical, or other electromagnetic system.
telegram	Written matter transmitted by telegraphy for delivery to the addressee.
telegraphy	Any transmission of a signal which results in a printed symbol; normally confined to Morse code communications.
telemetry	The transmission of remote-measuring data signals.
telephony	The transmission of speech, or other sounds.
teleprinter	An electrically-operated instrument used in the transmission and reception/printing of messages. Also called teletypewriter, radioprinter or teletype.
telex over radio (TOR)	Error correcting radioteletype (variously FEC, ARQ, SITOR, AMTOR).
tempest	A declassified code name referring to investigations and studies of compromising emanations--incidental radiations from electronic equipment.
text	The part of a message containing the basic information which the originator desires to be communicated.
time division multiplexing (TDM)	A process by which two or more channels of data are transmitted over the same frequency band by allocating a different time interval for the transmission of each channel.

traffic (tfc)	Communications volume during a given period.
transcription	A written copy of a previously recorded radio transmission.
transmission	The purposeful radiation of a signal from a transmitter.
transmitter	Equipment used to generate and radiate a radio signal into space via an antenna.
Travellers Information Station (TIS)	A low powered, voice-tape transmission broadcasting to motorists noncommercial road information and directions. Operates on 530 or 1610 kHz.
trigraph	A set of three letters
trinome	A set of three digits.
triplet	A group of three like symbols.
tropical bands	The three lowest-frequency SW broadcast bands (2300-2498, 3200-3400, 4750-5060 kHz).
upper sideband (USB)	The higher frequency or group of frequencies produced by an amplitude-modulation process.
utility communications	Non-broadcast communications, usually two-way, and including: aircraft, beacons, experimental, point to point, governmental, land mobile, maritime/coastal, military, radio telephone, amateur, and space satellites.
very low frequency (VLF)	The spectrum from 3-30 kHz, but often extended by common usage to approximately 500 kHz.
voice mirror	Continuously repeated (recorded) voice identification of a radio circuit.
VOLMET	HF station sending regional weather information for large international airports.
World Administration Radio Conference (WARC)	Held periodically by the International Telecommunications Union (ITU) in Geneva, Switzerland, as a means of cooperatively updating radio rules and regulations among member nations.
watt	The unit of power.
wave angle	The angle above the surface of the earth at which a signal is transmitted from or received by an antenna.
wavelength	The distance a radio wave, moving at the speed of light (186,000 miles per second) travels to complete one cycle; usually expressed in meters.
whip antenna	Flexible rod supported at one end.
working	Stations communicating with each other. In simplex working, stations operate on a common frequency; in complex working, more than one frequency is used.
zero beat	The condition between two signals indicating identical frequency; no beat note is heard or seen between the signals.

Phonetic Alphabets

	English	*French*	*German*	*Italian*	*Portuguese*	*Spanish*
A	Alpha	Alfa	Anton	Alfa	Antena	Alfa
B	Bravo	Bravo	Berta	Bravo	Bateria	Brasil
C	Charlie	Charlie	Cäsar	Canada	Condensador	Canada
D	Delta	Delta	Dora	Delta	Detector	Delta
E	Echo	Echo	Emil	Europa	Estatico	España
F	Foxtrot	Foxtrot	Friedrich	Firenze	Filamento	Francia
G	Golf	Golf	Gustav	Guatemala	Grade	Guatemala
H	Hotel	Hôtel	Heinrich	Hotel	Hotel	Hotel
I	India	India	Ida	Italia	Itensidade	Italia
J	Juliet	Juliett	Julius	Juventus	Juliete	Japón
K	Kilo	Kilo	Konrad	Kilometro	Kilo	Kilo
L	Lima	Lima	Ludwig	Lima	Lâmpada	Lima
M	Mike	Mike	Martha	Messico	Manipulador	Méjico
N	November	November	Nordpol	Novembre	Negativo	Noviembre
O	Oscar	Oscar	Otto	Otranto	Onda	Oscar
P	Papa	Papa	Paula	Palermo	Placa	Papa
Q	Quebec	Quebec	Quelle	Quebec	Quadro	Quito
R	Romeo	Romeo	Richard	Romeo	Rádio	Radio
S	Sierra	Sierra	Siegfried	Santiago	Sintonia	Santiago
T	Tango	Tango	Theodor	Tango	Terra	Tango
U	Uniform	Uniform	Ulrich	Università	Unidade	Universidad
V	Victor	Victor	Viktor	Venezia	Válvula	Victor
W	Whisky	Whiskey	Wilhelm	Whisky	Watt	Whisky
X	X-ray	X-ray	Xanthippe	Xilofono	Xilofono	Xilófono
Y	Yankee	Yankee	Ypsilon	Yokohama	Yucatan	Yucatán
Z	Zulu	Zulu	Zeppelin	Zelanda	Zulu	Zulu

Voice Procedure Signals

*Note: * indicates primarily military/government use*

Acknowledge	I have received and understand your message.
Affirmative	Yes or correct.
All after*	Repeat portion of message that follows:"_____".
All before*	Repeat portion of message that precedes:"___".
Break	Pause, interruption.
Clear	End of contact.
Come back	Used in place of OVER, primarily in CB and pleasure boat communications.
Correction*	Portion in error; correct version is:_____.
Disregard this transmission	This transmission is in error. Not to be used to cancel a previous message that has been completed.
Do not answer*	Stations called are not to reply or acknowledge transmission, which is followed by OUT.
End of message	Message completed.
Execute*	Carry out a prescribed action.
Execute to follow*	Action on message to be carried out upon receipt of EXECUTE.
Figures*	Numbers or numerals follow.
Flash*	Highest level of message precedence.
From	Originator of message.
How copy?	Requesting acknowledgement or signal report.
How do you read me?	Signal strength/readability request.
Immediate*	High precedence traffic which must not be delayed.
Info*	Following addressee designations are addressed for information.
I read back*	Following is in response to your instructions to read back.
I say again*	I am repeating transmission.
I spell*	Next word will be spelled phonetically.
I verify*	Following message (or portion) has been verified at your request and is repeated.
Mayday	Urgent distress call indicating immediate threat to life.
Message follows*	Message upcoming.
Negative	No.
Number	Station serial number
Out	My transmission is finished; no reply required.
Over	My transmission is finished; reply requested.
Pan	In air intercept; calling station has urgent message concerning the safety of a ship, aircraft, vehicle, or some person on board or within sight.
Precedence	Prioritized levels of message handling rated by urgency.
Priority*	Message handling precedence which requires prompt delivery.
Read back*	Repeat my transmission back to me exactly as received.
Relay to*	Transmit message to addressee(s) as follows
Roger	I received your last transmission.
Routine*	Message handling precedence which does not require accelerated treatment.
Say again*	Repeat your transmission.
Silence*	Stop transmitting immediately.
Silence lifted*	Resume transmission.
Speak slower*	Reduce speed of transmission.
That is correct*	You are correct or what you have transmitted is correct.
This is*	Transmission is from station whose callsign or ID follows.
Time*	Date/time group of message.
To*	Addressee(s) follow(s).
Unknown station*	Identity of station with whom I am attempting to contact is unknown.

GLOSSARY

Verify*	Verify message with originator and send correct version.
Wait*	Short pause.
Wait out*	I have to pause for more than a few seconds.
Wilco*	I will comply.
Word after*	What is the word following _____.
Word before*	What is the word that precedes_____.
Words twice*	Phrases or code groups will be repeated twice for clarification.
Wrong*	Your last transmission is incorrect. The correct version is_____.

CW Prosigns and Abbreviations

While Q signals expedite handling on CW networks, certain dot-dash groupings called prosigns are handy for signalling information quickly to operators. A bar over the letters indicates that there is no space between the letters; they are sent as a single dot-dash group.

AA	Unknown Station
AA	All After
AA	Arabic language
AB	All Before
ADR	Address (or addressee)
AGN	Again
AR	End of Transmission
AS	Short Wait
B	More to Follow
BK	Break
BN	Between
BT	Long Break
C	Correct; Yes
CC	Chinese language
CFM	Confirm
CHARAC	Character(s)
CK	Sometimes used for group count (GR)
CL	Closing Station
CLG	Calling
COL	Collate
CQ	General Call to All Stations
CS	Callsigns
CT	Net Control Station (NCS)
CUD	Could
CUL	See you later (later schedule)
CUT NBRS	Abbreviated Morse character for numbers; letters are sent for numbers
DE	From
DIP	Diplomatic
dissem	Dissemination
DLD	Delivered
DR	Dear
DTOI	Date/Time of intercept
DTG	Date/time group
DX	Long distance common (foreign countries)
E	East
EE	English language
EEEE...	Error
EMB	Embassy
ES	And
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
F	Do Not Answer
FB	Fine business, excellent
FF	French language
FH	First heard
F, FIG	Figure(s)
FM	From
FOLL	Followed, Following
FREQ	Frequency
FSK	Frequency shift keying
G	Repeat Back
GA	Go Ahead
GB	Good-by
GBA	Give better address
GE	Good evening
GG	Going
GG	German language
GM	Good morning
GND	Ground
GR	Group Count
GRP	Group(s)
GUD	Good
HDNG	Heading
HI	The telegraphic laugh, high
HQ	Headquarters
HR	Here
HRD	Heard
HV	Have
HW	How
ID,IDENT	Identification
II	Separative Sign
IMI	Repeat or question
INFO	Information
INT	Interogatory
INTEL	Intelligence
J	Verify with Originator and Repeat
K	Invitation to Transmit
KA	Starting Signal
L, LTRS	Letter(s)
LA	Latin America(n)
LANG	Language
LID	A poor operator
M	Deferred
MA,MILS	Milliamperes
MFA	Ministry of Foreign Affairs
MIN	Minute(s)
MSG	Message
N	Negative; No
N	North
NCS	Net control station
ND	Nothing doing
NIL	I have nothing to send
NM	No more

GLOSSARY

NOTAM	Notice to all mariners
NR	Number
NW	Now
NX	News
O	Operational Immediate
OB	Old boy
OL	Ocean Letter
OM	Old man
OPR	Operator
OPS	Operations
OS	Out station
OT	Old-timer, old top
P	Private radiotelegram
P	Priority
PBL	Preamble
POSS	Possible, possibly
PP	Portuguese language
P/P	Phone patch
PREV	Previous(ly)
PROB	Probably
PSE	Please
PT	Plain text
PTP	Point to point
PWR	Power
R	Received as transmitted
RCD	Received
RCVR	Receiver
RDO	Radio
REF	Reference
RPT	Repeat; report
RQ	Request
RR	Russian language
RX	Receive (er, ing)
RY's	RYRYRY ....(Radioteletype test tape)
S	South
SS	Spanish language
SED	Said
SIG	Signature
SINE	Operator's nickname or initials
SK	End
SKED	Schedule
SLT	Radiomarine Letter
SPEC	Special
SRI	Sorry
STN	Station
SVC	Service Telegram
SWL	Short wave listener
T	Station Called; Transmit to all Addressees; zero
TFC	Traffic
TKS/TNX	Thanks
TMW	Tomorrow
TO	Action Address
TOI	Time of intercept
TT	That
TU	Thank You
TVI	Television interference
TX	Transmitter
TXT	Text
UNID	Unidentified
UR	Your
UTE	Utility transmission
VE	Understood (sometimes used in place of BK)
VFO	Variable-frequency oscillator
VY	Very
W	West
W	Number of words in message (used in place of CK or GR)
WA	Word After
WB	Word Before
WD-WDS	Word; words
WKD-WKG	Worked; working
WL	Well, will
WRKG	Working (or WKG)
WPM	Words per minute (Morse code speed)
WUD	Would
WX	Weather Report
XCVR	Transceiver
XMTR(TX)	Transmitter
XSMN	Transmission
XTAL	Crystal
XYL (YF)	Wife
Y	Emergency
YL	Young lady
Z	Flash
5F, 5L	5-Figure, 5-Letter
73	Best regards
88	Love and kisses

The International Q-Code

To expedite traffic handling via Morse code, network operators have devised a system of "Q codes" which have specific meanings. The following abbreviated list will provide the listener with insight as to the meaning of signals copied during CW net operations.

QNA Answer in prearranged order.
QNB All net stations copy.
QND Net is directed.
QNE Entire net stand by.
QNF Net is not controlled.
QNG Take over as net control station.
QNH Your net frequency is high.
QNI Net stations report in.
QNJ Can you copy?
QNK Transmit messages.
QNL Your net frequency is low.
QNM You are interfering; stand by.
QNN Net control station is...
QNO Station is leaving the net.
QNP Unable to copy.
QNQ Move frequency to finish traffic.
QNS Following stations are in the net:...
QNT Request permission to leave the net.
QNU The net has traffic for you.
QNV Establish contact on this frequency.
QNW How do I route messages?
QNX You are excused from the net.
QNY Shift to another frequency to clear traffic.
QNZ Zero beat your signal with mine.
QRA What is the name of your station?
QRE What is your estimated time of arrival?
QRG Will you tell me the exact frequency?
QRH Does my frequency vary?
QRI How is the tone of my transmission? (1)Good, (3)Bad
QRK What is the intelligibility of my signals? (1)Bad, (5)Excellent.
QRL Are you busy?
QRM Is my transmission being interfered with? (1)No, (5)Extreme.
QRN Are you troubled by static? (1)No (5)Extreme.
QRO Shall I increase transmitter power?
QRP Shall I decrease transmitter power?
QRQ Shall I send faster?
QRR Are you ready for automatic operation?
QRRR EMERGENCY (Amateur only)
QRS Shall I send more slowly?
QRT Shall I stop sending?
QRU Have you anything for me?
QRV Are you ready?
QRW Shall I inform...that you are calling him?
QRX When will you call me again?
QRY When is my turn?
QRZ Who is calling me?
QSA What is my signal strength?
QSB Are my signals fading?
QSK Can you hear me if I break in on your transmission?
QSL Can you acknowledge receipt?
QSM Shall I repeat the last telegram?
QSN Did you hear me?
QSO Can you communicate with...?
QSP Will you relay?
QSR Shall I repeat the call?
QSS What frequency will you use?
QSU Shall I send on this frequency?
QSV Shall I send a series of Vs for adjustment?
QSW Will you send on this frequency?
QSX Will you listen?
QSY Shall I change frequency?
QSZ Shall I send each word or group more than once?
QTA Shall I cancel telegram number...?
QTB Do you agree with my counting of words?
QST General call to all amateurs.

Jamming

At this writing, several types of intentional interference are used to discourage listening. In most instances the effort is political, designed to irritate the listener so that he will not monitor a broadcast. Jamming transmitters may be classified as:

SPARK	Broadband electrical pulse noise capable of wiping out a wide spectrum (sounds like interference from a brush-type motor)
SWEEPER	A strong carrier, swept back and forth across the signal. When swept at an audio rate, sounds like a diesel engine.
STEP TONE	A constant series of audio tones, usually 3-5, randomly repeated on the signal (sounds like bagpipes)
NOISE	White noise transmitted over the jammed signal (sounds like a loud background hiss on a receiver)

Broadcast Jammers

For many years Communist bloc countries have deliberately jammed transmissions from the West to prevent or discourage reception by their citizens. A recent multinational effort coordinated by the International Telecommunications Union (ITU) was successful in finding the locations of those jammers which transmit two-character identifiers every few seconds (ostensibly to determine their effectiveness as reported by monitors).

Jammer CW ID	Jammer Location
1D	USSR
1G	USSR
4F	USSR
4N	USSR
7K	USSR
8L	E. Germany
AD	USSR
AG	USSR
AN	USSR
AR	USSR
AW	USSR
B1	Poland
BD	Poland
BG	Poland/USSR
BL	USSR
BQ	Poland/USSR
BR	Poland
BU	USSR
CB	USSR
D3	Czechoslovakia
DA	USSR
DG	USSR
DR	USSR
DU	USSR
FA	USSR
FG	Poland/USSR
FL	USSR
FU	Poland/USSR
G1	USSR
G3	Bulgaria
GI	USSR
GJ	USSR
GM	USSR
GR	USSR
GS	USSR
HM	USSR
HP	Czechoslovakia/USSR
IG	USSR
IN	USSR
IR	USSR
K3	Hungary
K7	Bulgaria
K8	Hungary
KB	USSR
KD	USSR
KF	Czechoslovakia
KM	USSR
KV	USSR
LK	Poland/USSR
LM	E. Germany
M5	Yugoslavia
MA	Poland
MF	E. Germany
MP	Poland
MS	Czechoslovakia
MU	USSR
MX	Poland
NS	USSR
P3	Hungary
PA	Poland
PB	USSR
PK	USSR
PL	Poland/USSR
R6	Bulgaria
R7	Yugoslavia
R9	E. Germany/Poland
RB	USSR
RT	USSR
S5	Czechoslovakia
ST	USSR
SU	USSR
TK	USSR
TR	Poland/USSR
TU	USSR
U7	Czechoslovakia

UA	USSR
UB	Romania/USSR
UN	USSR
UQ	USSR
US	USSR
VF	USSR
VG	USSR
VN	USSR
VR	Poland/USSR
W1	Czechoslovakia
WA	USSR
WD	USSR
WI	USSR
WM	USSR
WQ	Romania/Poland
Z1	Czechoslovakia
Z2	Yugoslavia
Z3	Czechoslovakia
ZM	Poland
ZT	USSR

...and Other Irritating Interference

The "Russian Woodpeckers" have been around for several years now. Generating incredibly strong pulses, these signals emanate from the USSR and are capable of detecting the intrusion of enemy aircraft into Russian air space. They are used as a form of Over the Horizon Backscatter Radar (OTHB).

The United States Air Force will soon begin transmitting a similar OTHB from Hanscom AFB, Massachusetts.

Occasional industrial, military and scientific frequency sweepers and ionosondes will be heard from time to time due to the long distance propagation qualities of the high frequency spectrum.

GLOSSARY

International Callsign Prefixes

Callsign Prefixes	Country
AAA-ALZ	UNITED STATES
AMA-AOZ	SPAIN
APA-ASZ	PAKISTAN
ATA-AWZ	INDIA
AXA-AXZ	AUSTRALIA
AYA-AZZ	ARGENTINA
A2A-A2Z	BOTSWANA
A3A-A3Z	TONGA
A4A-A4Z	OMAN
A5A-A5Z	BHUTAN
A6A-A6Z	UNION OF ARAB EMIRATES
A7A-A7Z	QATAR
A9C-A9Z	BAHRAIN
BAA-BZZ	CHINA
BVA-BVZ	TAIWAN
CAA-CEZ	CHILE
CFA-CKZ	CANADA
CLA-CMZ	CUBA
CNA-CNZ	MOROCCO
COA-COZ	CUBA
CPA-CPZ	BOLIVIA
CQA-CUZ	PORTUGAL
CU	CUBA
CSA-CSZ	PORTUGAL
CVA-CXZ	URUGUAY
CYA-CZZ	CANADA
C2A-C2Z	NAURU
C3A-C3Z	ANDORRA
C4A-C4Z	CYPRUS
C5A-C5Z	GAMBIA
C6A-C6Z	BAHAMAS
C7A-C7Z	WORLD METEOROLOGICAL ORGANIZATION
C8A-C9Z	MOZAMBIQUE
DAA-DRZ	WEST GERMANY
DSA-DTZ	SOUTH KOREA
DUA-DZZ	PHILIPPINES
D2A-D3Z	ANGOLA
D4A-D4Z	CAPE VERDE IS.
D5A-D5Z	LIBERIA
D6A-D6Z	COMOROS
D7A-D9Z	SOUTH KOREA (REP)
EAA-EHZ	SPAIN
EIA-EJZ	IRELAND
EKA-EKZ	USSR
ELA-ELZ	LIBERIA
EMA-EOZ	USSR
EPA-EQZ	IRAN
ERA-ERZ	USSR
ESA-ESZ	ESTONIA
ETA-ETZ	ETHIOPIA
EUA-EWZ	BIELORUSSIA SSR
EXA-EZZ	USSR
FAA-FZZ	FRANCE
GAA-GZZ	UNITED KINGDOM
HAA-HAZ	HUNGARY
HBA-HBZ	SWITZERLAND & LIECHTENSTEIN
HCA-HDZ	ECUADOR
HEA-HEZ	SWITZERLAND
HFA-HFZ	POLAND
HGA-HGZ	HUNGARY
HHA-HHZ	HAITI
HIA-HIZ	DOMINICAN REPUBLIC
HJA-HKZ	COLOMBIA
HLA-HLZ	SOUTH KOREA
HMA-HMZ	NORTH KOREA (DEM.P.R.)
HNA-HNZ	IRAQ
HOA-HPZ	PANAMA
HQA-HRZ	HONDURAS
HSA-HSZ	THAILAND
HTA-HTZ	NICARAGUA
HUA-HUZ	EL SALVADOR
HVA-HVZ	VATICAN CITY
HWA-HYZ	FRANCE
HZA-HZZ	SAUDI ARABIA
H2A-H2Z	CYPRUS
H3A-H3Z	PANAMA
H4A-H4Z	SOLOMON ISLANDS
H6A-H7Z	NICARAGUA
H8A-H9Z	PANAMA
IAA-IZZ	ITALY
JAA-JSZ	JAPAN
JTA-JVZ	MONGOLIA
JWA-JXZ	NORWAY
JYA-JYZ	JORDAN
JZA-JZZ	WESTERN NEW GUINEA
J2A-J2Z	DJIBOUTI
J3A-J3Z	GRENADA
J4A-J4Z	GREECE
J5A-J5Z	GUINEA-BISSAU
J6A-J6Z	SAINT LUCIA
J7A-J7Z	DOMINICA
J8A-K8Z	ST. VINCENT & GRENADIE
KAA-KZZ	UNITED STATES
LAA-LNZ	NORWAY
LOA-LWZ	ARGENTINA
LXA-LXZ	LUXEMBOURG
LYA-LYZ	LITHUANIA
LZA-LZZ	BULGARIA
L2A-L9Z	ARGENTINA

MAA-MZZ	UNITED KINGDOM
NAA-NZZ	UNITED STATES
OAA-OCZ	PERU
ODA-ODZ	LEBANON
OEA-OEZ	AUSTRIA
OFA-OJZ	FINLAND
OKA-OMZ	CZECHOSLOVAKIA
ONA-OTZ	BELGIUM
OUA-OZZ	DENMARK
PAA-PIZ	NETHERLANDS
PJA-PJZ	NETHERLANDS ANTILLES
PKA-POZ	INDONESIA
PPA-PYZ	BRAZIL
PZA-PZZ	SURINAME
P2A-P2Z	PAPUA NEW GUINEA
P3A-P3Z	CYPRUS
P4A-P4Z	NETHERLANDS ANTILLES
P5A-P9Z	NORTH KOREA (DEM.P.R.)
QAA-QZZ	INT'L MORSE ABBREVIATIONS
RAA-RZZ	USSR
SAA-SMZ	SWEDEN
SNA-SRZ	POLAND
SSA-SSM	EGYPT
SSN-STZ	SUDAN
SUA-SUZ	EGYPT
SVA-SZZ	GREECE & ISLANDS
S2A-S3Z	BANGLADESH
S6A-S6Z	SINGAPORE
S7A-S7Z	SEYCHELLES
S8A-S9Z	SAO TOME & PRINCIPE
TAA-TCZ	TURKEY
TDA-TDZ	GUATEMALA
TEA-TEZ	COSTA RICA
TFA-TFZ	ICELAND
TGA-TGZ	GUATEMALA
THA-THZ	FRANCE
TIA-TIZ	COSTA RICA
TJA-TJZ	CAMEROON
TKA-TKZ	FRANCE
TLA-TLZ	CENTRAL AFRICAN REP.
TMA-TMZ	FRANCE
TNA-TNZ	CONGO
TOA-TQZ	FRANCE
TRA-TRZ	GABON REPUBLIC
TSA-TSZ	TUNISIA
TTA-TTZ	CHAD REPUBLIC
TUA-TUZ	IVORY COAST
TVA-TXZ	FRANCE
TYA-TYZ	BENIN
TZA-TZZ	MALI REPUBLIC
T2A-T2Z	TUVALU
T3A-T3Z	KIRIBATI
T4A-T4Z	CUBA
T5A-T5Z	SOMALI DEM. REP.
T6A-T6Z	AFGHANISTAN
T7A-T7Z	SAN MARINO
UAA-UQZ	USSR
URA-UTZ	UKRAINE
VAA-VGZ	CANADA
VHA-VNZ	AUSTRALIA
VOA-VOZ	CANADA
VPA-VSZ	UNITED KINGDOM
VTA-VWZ	INDIA
VXA-VYZ	CANADA
VZA-VZZ	AUSTRALIA
V2A-V2Z	ANTIGUA
V3A-V3Z	BELIZE
V4A-V4Z	ST. CHRISTOPHER & NEVIS
V8A-V8Z	BRUNEI
WAA-WZZ	UNITED STATES
XAA-XIZ	MEXICO
XJA-XOZ	CANADA
XPA-XPZ	DENMARK
XQA-XRZ	CHILE
XSA-XSZ	CHINA
XTA-XTZ	BOURKINA FASO
XUA-XUZ	KAMPUCHEA
XVA-XVZ	VIET NAM
XWA-XWZ	LAOS
XXA-XXZ	PORTUGAL
XYA-XZZ	BURMA
YAA-YAZ	AFGHANISTAN
YBA-YHZ	INDONESIA
YIA-YIZ	IRAQ
YJA-YJZ	VANUATU (NEW HEBRIDES)
YKA-YKZ	SYRIA
YLA-YLZ	LATVIA
YMA-YMZ	TURKEY
YNA-YNZ	NICARAGUA
YOA-YRZ	RUMANIA
YSA-YSZ	EL SALVADOR
YTA-YUZ	YUGOSLAVIA
YVA-YYZ	VENEZUELA
YZA-YZZ	YUGOSLAVIA
Y2A-Y9Z	EAST GERMANY (GDR)
ZAA-ZAZ	ALBANIA
ZBA-ZJZ	UNITED KINGDOM
ZKA-ZMZ	NEW ZEALAND
ZNA-ZOZ	UNITED KINGDOM
ZPA-ZPZ	PARAGUAY
ZQA-ZQZ	UNITED KINGDOM
ZRA-ZUZ	SOUTH AFRICA
ZVA-ZZZ	BRAZIL
Z2A-Z2Z	ZIMBABWE
2AA-2ZZ	UNITED KINGDOM
3AA-3AZ	MONACO
3BA-3BZ	MAURITIUS

GLOSSARY

3CA-3CZ	EQUATORIAL GUINEA
3DA-3DM	SWAZILAND
3DN-3DZ	FIJI
3EA-3FZ	PANAMA
3GA-3GZ	CHILE
3HA-EUZ	CHINA
3VA-3VZ	TUNISIA
3WA-3WZ	VIET NAM
3XA-3XZ	GUINEA
3YA-3YZ	NORWAY
3ZA-3ZZ	POLAND
4AA-4CZ	MEXICO
4DA-4IZ	PHILIPPINES
4JA-4LZ	USSR
4MA-4MZ	VENEZUELA
4NA-4OZ	YUGOSLAVIA
4PA-4SZ	SRI LANKA
4TA-4TZ	PERU
4UA-4UZ	UNITED NATIONS
4VA-4VZ	HAITI
4WA-4WZ	YEMEN
4XA-4XZ	ISRAEL
4YA-4YZ	INT'L CIVIL AVIATION ORGANIZATION
4ZAQ-4ZZ	ISRAEL
5AA-5AZ	LIBYA
5BA-5BZ	CYPRUS
5CA-5GZ	MOROCCO
5HA-5IZ	TANZANIA
5JA-5KZ	COLOMBIA
5LA-5MZ	LIBERIA
5NA-5OZ	NIGERIA
5PA-5QZ	DENMARK
5RA-5SZ	MADAGASCAR
5TA-5TZ	MAURITANIA
5UA-5UZ	NIGER
5VA-5VZ	TOGO
5WA-5WZ	WESTERN SAMOA
5XA-5XZ	UGANDA
5YA-5ZZ	KENYA
6AA-6BZ	EGYPT
6CA-6CZ	SYRIA
6DA-6JZ	MEXICO
6KA-6NZ	KOREA (REPUBLIC)
6OA-6OZ	SOMALIA
6PA-6SZ	PAKISTAN
6TA-6UZ	SUDAN
6VA-6WZ	SENEGAL
6XA-YXZ	MALAGASY
6YA-6YZ	JAMAICA
6ZA-6ZZ	LIBERIA
7AA-7IZ	INDONESIA
7JA-7NZ	JAPAN
7OZ-7OZ	YEMEN (DEM.P.R.)
7PA-7PZ	LESOTHO
7QA-7QZ	MALAWI
7RA-7RZ	ALGERIA
7SA-7SZ	SWEDEN
7TA-TYZ	ALGERIA
7ZA-7ZZ	SAUDI ARABIA
8AA-8IZ	INDONESIA
8JA-8NZ	JAPAN
8OA-8OZ	BOTSWANA
8PA-8PZ	BARBADOS
8QA-8QZ	MALDIVE ISLANDS
8RA-8RZ	GUYANA
8SA-8SZ	SWEDEN
8TA-8YZ	INDIA
8ZA-8ZZ	SAUDI ARABIA
9AA-9AZ	SAN MARINO
9BA-8DZ	IRAN
9EA-9FZ	ETHIOPIA
9GA-9GZ	GHANA
9HA-9HZ	MALTA
9IA-9JZ	ZAMBIA
9KA-9KZ	KUWAIT
9LA-9LZ	SIERRA LEONE
9MA-9MZ	MALAYSIA
9NA-9NZ	NEPAL
9OA-9TZ	ZAIRE
9UA-9UZ	BURUNDI
9VA-9VZ	SINGAPORE
9WA-9WZ	MALAYSIA
9XA-9XZ	RWANDA
9YA-9ZZ	TRINIDAD & TOBAGO

U.S. Call Sign Identification

KAA-KZZ, WAA-WZZ	Public coastal station
KAA20-KZZ99, WAA20-WZZ99	Fixed station
KAA200-KZZ999, WAA200-WZZ999	Limited coastal station; land mobile base
KAAA-KZZZZ, WAAA-WZZZ	Broadcasting; ship telegraph & telephone
KAAA2-KZZZ9, WAAA2-WZZZ9	Land mobile telegraph disaster station
WA2000-WZ9999	Ship telephone only
KA2XAA-KZ9XZZ, WA2XAA-WZ9XZZ	Experimental
KAAA20-KZZZ99, WAAA20-WZZZ99	Ship survival craft
KA2000-KZ9999, WA2000-WZ999	Marine utility; land mobile telephone
KAAAA-KZZZZ, WAAAA-WZZZZ	Aircraft telegraph & telephone
KAA2-WZZ9, WAA2-WZZ9	Aeronautical
A1AA-A0ZZ, K1AA-K0ZZ	Amateur
N1AA-N0ZZ, W1AA-W0ZZ	Amateur
KA1AA-KZ0ZZ	Amateur
WA1AA-KZ0ZZ	Amateur

U.S. Band Plan Primary Allocations

Frequency	Service
1600-1800	Radionavigation
1800-2000	Amateur
2000-2065	Fixed/mobile
2065-2107	Maritime mobile
2107-2170	Maritime mobile
2173-2190	Mobile
2190-2194	Maritime mobile
2194-2500	Fixed/mobile
2500-2850	Fixed/mobile
2850-3155	Aeronautical mobile
3155-3400	Fixed/mobile
3400-3500	Aeronautical mobile
3500-4000	Amateur
4000-4063	Fixed
4063-4438	Maritime/mobile
4438-4650	Fixed/aero/mobile
4650-4750	Aero mobile
4750-4850	Fixed
4850-5000	Fixed/mobile
5000-5250	Fixed
5250-5450	Fixed/mobile
5450-5730	Aeronautical mobile
5730-5950	Fixed
5950-6200	Broadcasting
6200-6525	Maritime mobile
6525-6765	Aeronautical mobile
6765-7000	Fixed
7000-7300	Amateur
7300-8195	Fixed
8195-8815	Maritime mobile
8815-9040	Aero mobile
9040-9500	Fixed
9500-9775	Broadcasting
9775-10000	Fixed
10000-10100	Aero mobile
10100-11175	Fixed
11175-11400	Aero mobile
11400-11700	Fixed
11700-11975	Broadcasting
11975-12330	Fixed
12330-13200	Maritime mobile
13200-13360	Aero mobile
13360-14000	Fixed
14000-14350	Amateur
14350-15000	Fixed
15010-15100	Aero mobile
15100-15450	Broadcasting
15450-16460	Fixed
16460-17360	Maritime mobile
17360-17700	Fixed
17700-17900	Broadcasting
17900-18030	Aero mobile

18030-21000	Fixed
21000-21450	Amateur
21450-27650	Broadcasting
21750-21850	Fixed
21850-21870	Radio astronomy
21870-22000	Aero fixed/mobile
22000-22720	Maritime mobile
22720-23200	Fixed
23200-23350	Aero fixed/mobile
23350-25000	Fixed/mobile
25000-25070	Land mobile
25070-25110	Maritime mobile
25110-25330	Land mobile
25330-25600	Fixed/mobile
25600-26100	Broadcasting
26100-26480	Land mobile
26480-26950	Fixed/mobile
26965-27405	CB
27405-28000	Fixed/mobile
28000-29700	Amateur
29700-30000	Fixed/mobile

Emission Classifications

A shorthand method of indicating the mode of transmission has been adopted universally. The three characters indicate basic modulation type, nature of the modulation, and nature of the information.

N0N	Unmodulated carrier
A1A	Telegraphy by on-off keying (OOK), for aural reception
A1B	Telegraphy by on-off keying for automatic reception
A2A	Telegraphy by tone-modulation of continuous carrier (MCW)
J2A	Telegraphy by tone-modulation of SSB system
A3E	Conventional, double-sideband, amplitude modulation
H3E	Single sideband, full carrier
R3E	Single sideband, reduced carrier (usually 6 dB)
J3E	Single sideband, suppressed carrier (USB or LSB)
B8E	Independent sideband, analog content (SWBC feeders)
B9W	Independent sideband, data or telegraphy in one channel
F1B	Radioteletype using frequency-shift keying
F1D	Data communication using FSK
F3E	Frequency modulated radiotelephone
G3E	Phase modulated radiotelephone (sounds the same)
J2B	RTTY using audio FSK to SSB (sounds the same)
J2C	Quantized (digital) slow-scan television or FAX
J3C	Standard, analog, slow-scan television or FAX
PON	Pulse

Land/Mobile AM/FM Allocations

20 kHz spacing:
25110-25600 26100-26950 27290-28000

10 kHz spacing:
29700-29890 29910-30000

PETROLEUM INDUSTRY (FM)
25020-25320 (20 kHz channel spacing)

RADIO/TV REMOTE BROADCAST
25870-26470 (40 kHz channel spacing)

FORESTRY NETWORKS (FM)
29710-29790 (20 kHz channel spacing)

BUSINESS (FM)
27410-27530 (20 kHz channel spacing)

FEDERAL GOVERNMENT
27575 27585 (4 watt mobile/walkie-talkie)

FREQUENCY CROSS REFERENCE

The following exhaustive list of frequencies provides immediate identification of service. For additional information, consult the referenced service or agency as found in the Table of Contents. The cross reference is representative but does not comprehensively list all frequencies found in the book.

Since smuggling, spy numbers, and CB outbander frequencies are irregular and unassigned, they are not included in the frequency list. For the same reason, facsimile, RTTY, amateur bands, and international radio broadcasters are also not represented in the cross-reference, although you will find they receive thorough treatment in the body of the book.

Cross Reference Key

Frequency Code:

The first letter group indicates the service - the second is the country.

Service:

A	Aircraft
AF	Air Force
AR	Army
BC	Broadcasting
CC	Common Carrier
CG	Coast Guard
FAX	Facsimile
G	Government
LW	Longwave
M	Maritime
N	Navy
PR	Private, Business, Scientific
PS	Public Safety
RTTY	Radioteleype
SP	Space

Country:

AFS	REPUBLIC OF SOUTH AFRICA
AGL	ANGOLA
ALG	ALGERIA
ARG	ARGENTINA
ARS	SAUDI ARABIA
ATN	NETHERLANDS ANTILLES
AUS	AUSTRALIA
AUT	AUSTRIA
B	BRAZIL
BAH	BAHAMAS
BEL	BELGIUM
BUL	BULGARIA
CAN	CANADA
CHL	CHILE
CHN	CHINA
CLM	COLOMBIA
COG	CONGO
CUB	CUBA
D	WEST GERMANY (FED REP)
DDR	EAST GERMANY (DEM REP)
DNK	DENMARK
DOM	DOMINICAN REPUBLIC
E	SPAIN
EGY	EGYPT
EQA	ECUADOR
ETH	ETHIOPIA
F	FRANCE
FIN	FINLAND
G	UNITED KINGDOM
GHA	GHANA
GRC	GREECE
GTM	GUATEMALA
GUM	GUAM
HNB	BELIZE
HND	HONDURAS
HNG	HUNGARY
HOL	NETHERLANDS
HTI	HAITI
I	ITALY
IND	REPUBLIC OF INDIA
INS	INDONESIA
IRL	IRELAND
IRN	IRAN
IRQ	IRAQ
ISR	ISRAEL
J	JAPAN
JOR	JORDAN
KOR	REPUBLIC OF KOREA
KRE	DEM PEOPLE'S REP OF KOREA
KWT	KUWAIT
LBY	LIBYA
MLA	MALASIA
MNG	MONGOLIA
MRC	MOROCCO
NCG	NICARAGUA
NGR	NIGER
NIG	NIGERIA
NOR	NORWAY
NZL	NEW ZEALAND
PAK	PAKISTAN
PHL	PHILIPPINES
PNR	PANAMA
POL	POLAND
PTR	PUERTO RICO (ALSO PR)
ROU	ROUMANIA
S	SWEDEN
SAU	SAUDI ARABIA
SEN	SENEGAL
SLV	EL SALVADOR
SMA	AMERICAN SAMOA
SUI	SWITZERLAND
TAI	TAIWAN
TCH	CZECHOSLOVAKIA
THA	THAILAND
TUN	TUNISIA
TUR	TURKEY
UAE	UNITED ARAB EMIRATES
URS	USSR
US	UNITED STATES
VEN	VENEZUELA
VTN	VIET NAM
YUG	YUGOSLAVIA

Areas:

SAM	SOUTH AMERICA
NAM	NORTH AMERICA
WW	WORLDWIDE
CRIB	CARIBBEAN

0.0760	LW-WW-1	80.0500	LW-WW-1	432.0000	CG-CAN	1653.0000	M-US-1	1972.5000	M-US-3
10.0000	G-WW-3	81.0000	LW-WW-1	435.0000	G-WW-3	1655.0000	M-US-2	2001.0000	AR-US-3
10.2000	LW-WW-1	83.1000	LW-WW-1	440.0000	CG-CAN	1657.0000	CC-US-2	2003.0000	CG-US-8
11.0500	LW-WW-1	83.8000	LW-WW-1	448.0000	CG-CAN	1658.4000	M-US-1	2003.0000	CG-CAN
11.3300	LW-WW-1	88.0000	G-WW-3	450.0000	CG-CAN	1658.4250	M-US-1	2003.0000	M-US-3
11.8000	LW-WW-1	88.0000	LW-WW-1	466.0000	CG-CAN	1660.0000	M-US-1	2003.0000	PR-US-6
11.9050	LW-WW-1	91.1500	G-WW-3	470.0000	CG-CAN	1660.0000	CC-US-2	2003.0000	CC-US-2
12.0000	LW-WW-1	100.0000	LW-WW-1	472.0000	CG-CAN	1660.0150	M-US-1	2005.0000	PR-US-6
12.1000	LW-WW-1	106.7000	LW-WW-1	500.0000	CG-CAN	1662.0000	M-US-2	2006.0000	N-AFS
12.3000	LW-WW-1	110.0000	LW-WW-1	518.0000	CG-CAN	1665.0000	M-US-2	2006.0000	PR-US-6
12.6490	LW-WW-1	110.6000	LW-WW-1	530.0000	BC-US-2	1665.0000	PR-US-5	2006.0000	CC-US-2
12.8000	LW-WW-1	111.3000	LW-WW-1	806.0000	AR-CAN	1670.0000	M-US-2	2009.0000	M-US-3
12.9000	LW-WW-1	111.8000	LW-WW-1	808.0000	G-CAN-2	1673.0000	M-CAN-1	2010.0000	AF-US-3
13.0000	LW-WW-1	112.1500	LW-WW-1	823.0000	G-CAN-2	1674.0000	M-CAN-1	2020.0000	PS-AUS
13.1000	LW-WW-1	113.2000	LW-WW-1	1000.0000	PR-US-1	1675.0000	M-US-2	2025.0000	N-US-3
13.6000	LW-WW-1	117.4000	LW-WW-1	1106.0000	G-US-3	1680.0000	PR-US-5	2030.0000	CC-CAN
14.8810	LW-WW-1	119.0000	LW-WW-1	1261.4000	CG-US-1	1682.0000	M-US-2	2031.0000	PR-US-6
15.1000	LW-WW-1	119.1500	LW-WW-1	1337.0000	M-US-3	1685.0000	M-US-2	2031.5000	M-US-3
16.0000	G-WW-3	119.8500	LW-WW-1	1455.8889	M-WW-1	1689.0000	M-US-2	2037.5000	M-US-3
16.0000	LW-WW-1	120.0000	LW-WW-1	1500.0000	AF-SAU	1690.0000	PR-US-5	2040.0000	CG-CAN
16.7000	LW-WW-1	122.2000	LW-WW-1	1600.0000	M-US-2	1692.0000	M-US-2	2049.0000	AF-US-8
16.8000	LW-WW-1	122.3000	LW-WW-1	1600.0000	PR-US-6	1695.0000	PR-US-5	2050.0000	N-J
17.1000	LW-WW-1	122.5000	LW-WW-1	1602.0000	M-US-2	1700.0000	M-US-2	2054.0000	CG-CAN
18.5000	LW-WW-1	122.6500	LW-WW-1	1606.0000	BC-US-1	1700.0000	PR-US-6	2061.5000	M-US-3
19.0000	LW-WW-1	123.0000	LW-WW-1	1610.0000	M-CAN-1	1705.0000	M-CAN-1	2063.0000	M-US-3
19.6000	LW-WW-1	124.0000	LW-WW-1	1610.0000	M-US-2	1705.0000	PR-US-5	2064.0000	AR-US-2
20.0000	LW-WW-1	125.2000	LW-WW-1	1610.0000	BC-US-2	1705.0000	CC-US-2	2065.0000	PR-US-6
20.5000	LW-WW-1	125.8000	LW-WW-1	1613.0000	M-US-2	1709.0000	CC-US-2	2066.5000	CG-CAN
21.1000	LW-WW-1	128.3000	LW-WW-1	1614.0000	PR-US-6	1710.0000	PR-US-5	2079.0000	PR-US-6
21.4000	LW-WW-1	129.5000	LW-WW-1	1615.0000	M-US-2	1712.0000	CC-US-2	2082.5000	M-US-3
22.3000	LW-WW-1	131.4000	LW-WW-1	1616.0000	M-CAN-1	1714.0000	M-CAN-1	2083.9000	CG-CAN
23.0000	LW-WW-1	131.8000	LW-WW-1	1618.5000	M-US-1	1715.0000	M-US-2	2086.0000	M-US-4
23.1000	LW-WW-1	133.1500	LW-WW-1	1618.6000	M-CAN-1	1715.5000	M-CAN-1	2086.0000	M-US-4
23.4000	LW-WW-1	133.8500	LW-WW-1	1619.6400	M-US-1	1716.0000	M-CAN-1	2093.0000	CG-US-8
24.0000	G-WW-3	134.2000	LW-WW-1	1620.0000	M-CAN-1	1718.5900	M-US-1	2094.4000	CG-CAN
24.0000	LW-WW-1	134.9000	LW-WW-1	1620.0000	M-US-2	1722.0000	M-WW-2	2094.4000	G-US-11
24.8000	LW-WW-1	136.0000	LW-WW-1	1622.0000	BC-US-1	1725.0000	PR-US-5	2101.4000	CG-CAN
25.0000	LW-WW-1	136.3000	LW-WW-1	1622.9000	M-CAN-1	1729.0000	M-WW-2	2103.5000	CG-US-1
25.1000	LW-WW-1	136.8000	LW-WW-1	1623.0000	M-US-2	1735.0000	PR-US-5	2104.0000	M-WW-2
25.5000	LW-WW-1	139.0000	LW-WW-1	1624.0000	M-CAN-1	1736.0000	M-WW-2	2104.9000	CG-CAN
25.8000	LW-WW-1	139.1000	LW-WW-1	1624.0000	M-AUS	1740.0000	PR-US-5	2104.9000	G-CAN-4
26.1000	LW-WW-1	139.5000	LW-WW-1	1625.0000	M-US-2	1743.0000	M-WW-2	2111.0000	M-WW-2
26.5000	LW-WW-1	140.3000	LW-WW-1	1626.9000	M-CAN-1	1745.0000	M-US-2	2115.0000	CC-US-2
27.1000	LW-WW-1	140.5000	LW-WW-1	1627.0000	M-CAN-1	1746.8000	M-CAN-1	2118.0000	CG-CAN
27.9000	LW-WW-1	142.2500	LW-WW-1	1627.0000	M-US-2	1750.0000	M-CAN-1	2118.0000	M-US-3
28.5000	LW-WW-1	142.8600	LW-WW-1	1628.5000	M-CAN-1	1750.0000	M-WW-2	2118.0000	CC-US-2
37.2000	LW-WW-1	143.5000	LW-WW-1	1630.0000	M-CAN-1	1750.0000	PR-US-5	2118.0000	PR-US-6
38.0000	LW-WW-1	146.0000	LW-WW-1	1630.0000	M-US-2	1753.0000	M-CAN-1	2119.4000	G-CAN-4
40.0000	G-WW-3	147.2000	LW-WW-1	1632.0000	M-CAN-1	1755.0000	PR-US-5	2126.0000	M-US-1
40.0000	LW-WW-1	148.5500	LW-WW-1	1632.0000	M-US-2	1757.0000	M-CAN-1	2126.0000	M-US-3
42.2500	LW-WW-1	150.5000	AF-US-5	1632.5000	M-CAN-1	1759.0000	M-CAN-1	2130.0000	N-US-1
44.0000	LW-WW-1	153.0000	AF-US-5	1635.0000	M-US-2	1761.5000	M-CAN-1	2131.0000	M-US-2
48.5000	LW-WW-1	156.7500	AF-US-5	1638.0000	M-US-2	1762.5000	M-CAN-1	2131.0000	M-US-3
50.0000	G-WW-3	159.2500	AF-US-5	1638.9000	M-CAN-1	1763.0000	M-CAN-1	2132.0000	PR-US-6
50.0000	LW-WW-1	160.5000	AF-US-5	1639.0000	M-CAN-1	1764.0000	M-WW-2	2134.0000	CG-CAN
51.6000	LW-WW-1	162.0000	LW-WW-1	1640.0000	M-CAN-1	1764.5000	M-CAN-1	2134.0000	M-US-2
53.0000	LW-WW-1	163.2500	AF-US-5	1640.0000	M-US-2	1764.8000	M-CAN-1	2134.0000	M-US-3
53.6000	LW-WW-1	165.7500	AF-US-5	1640.3000	M-US-1	1765.0000	M-CAN-1	2141.0000	CG-US-2
54.0500	LW-WW-1	168.0000	LW-WW-1	1643.0000	M-US-1	1765.0000	PR-US-5	2142.0000	CG-CAN
55.2500	LW-WW-1	170.5000	AF-US-5	1643.0000	CC-US-2	1765.6000	M-CAN-1	2142.0000	M-US-3
55.5000	LW-WW-1	171.7500	AF-US-5	1643.7000	M-US-1	1766.0000	M-CAN-1	2142.0000	PR-US-6
56.5000	LW-WW-1	173.0000	AF-US-5	1644.0000	M-CAN-1	1766.5000	M-CAN-1	2150.0000	N-US-1
57.8000	LW-WW-1	174.0000	LW-WW-1	1645.0000	M-CAN-1	1767.5000	M-CAN-1	2153.0000	M-WW-2
57.9000	LW-WW-1	177.0000	G-WW-3	1645.0000	M-US-2	1769.0000	M-CAN-1	2158.0000	M-US-3
58.7000	LW-WW-1	183.0000	LW-WW-1	1645.0000	PR-US-5	1770.0000	M-CAN-1	2158.0000	M-ATN
59.0000	LW-WW-1	185.0000	G-WW-3	1646.0000	BC-US-1	1770.0000	PR-US-5	2158.0000	PR-US-6
60.0000	G-WW-3	187.0000	LW-WW-1	1646.0000	CC-US-2	1771.0000	M-CAN-1	2160.0000	CC-CAN
60.0000	LW-WW-1	193.0000	LW-WW-1	1646.7000	M-US-1	1772.0000	M-CAN-1	2166.0000	M-US-3
61.8000	LW-WW-1	197.5000	LW-WW-1	1646.7000	M-CAN-1	1782.0000	M-AUS	2166.0000	M-US-3
62.6000	LW-WW-1	201.0000	G-CAN-2	1647.7000	M-US-1	1785.0000	M-CAN-1	2173.5000	CG-US-1
66.6600	LW-WW-1	202.0000	G-CAN-2	1648.0000	M-US-1	1788.0000	M-CAN-1	2182.0000	CG-US-1
66.6660	G-WW-3	315.0000	G-CAN-2	1648.0000	M-CAN-1	1790.0000	G-US-10	2182.0000	CG-US-8
73.6000	LW-WW-1	316.0000	G-CAN-2	1649.0000	M-US-1	1792.0000	G-CAN-4	2182.0000	M-WW-2
75.0000	G-WW-3	317.0000	G-CAN-2	1649.0000	CC-US-2	1798.5000	M-US-1	2182.0000	PS-CRIB
75.0000	LW-WW-1	318.0000	G-CAN-2	1649.7000	M-US-1	1798.5000	M-US-1	2196.0000	G-US-10
76.2000	LW-WW-1	319.0000	G-CAN-2	1650.0000	M-US-2	1799.6000	M-US-1	2197.0000	PR-US-6
77.1500	LW-WW-1	334.0000	G-CAN-2	1650.0000	PR-US-5	1827.0000	M-WW-2	2198.0000	M-US-3
77.5000	G-WW-3	416.0000	CG-CAN	1652.0000	CC-US-2	1841.0000	M-WW-2	2200.0000	PR-US-6
77.5000	LW-WW-1	427.0000	CG-CAN	1652.7000	M-US-1	1919.5000	M-US-3	2201.0000	M-WW-2

2201.5000 G-CAN-4
2203.0000 M-US-3
2204.0000 PR-US-6
2206.0000 CG-CAN
2206.0000 G-CAN-4
2206.0000 M-US-3
2206.0000 PR-US-6
2207.0000 M-WW-2
2207.4000 G-CAN-4
2220.0000 AR-US-1
2220.0000 AR-US-3
2220.0000 G-US-8
2220.0000 M-CAN
2221.5000 G-CAN-2
2221.5000 G-CAN-4
2225.0000 PR-US-6
2234.0000 CG-US-8
2236.0000 CG-US-3
2236.5000 CG-US-3
2237.0000 CG-CAN
2237.0000 G-CAN-4
2237.0000 M-US-2
2237.0000 M-US-3
2240.0000 G-CAN-3
2240.0000 M-US-2
2240.0000 M-US-3
2242.0000 PR-US-6
2243.5000 CG-US-8
2247.5000 G-CAN-3
2253.0000 CC-US-2
2256.0000 CC-US-2
2258.0000 AR-US-1
2259.5000 AR-US-3
2260.0000 PS-AUS
2261.0000 CG-US-2
2269.5000 G-US-9
2280.0000 PS-AUS
2287.5000 G-US-2
2289.0000 PR-US-4
2292.0000 G-CAN-4
2292.0000 PR-US-4
2295.0000 G-US-8
2300.0000 AR-US-1
2300.0000 AR-US-2
2308.0000 AR-US-3
2309.0000 M-US-2
2309.0000 M-US-3
2312.0000 M-US-2
2312.0000 M-US-3
2312.0000 CC-US-2
2318.0000 CG-CAN
2319.4000 G-CAN-2
2320.0000 G-US-1
2326.0000 AR-US-2
2326.0000 G-US-7
2328.0000 CG-US-8
2330.0000 CG-US-3
2332.0000 G-US-12
2340.0000 CG-CAN
2340.0000 G-CAN-4
2348.5000 AR-US-2
2350.0000 AR-US-2
2360.0000 AR-US-1
2360.0000 G-US-1
2366.0000 M-US-3
2368.0000 N-US-1
2371.0000 AF-US-7
2374.0000 AF-US-7
2377.0000 G-US-1
2381.5000 PR-WW-2
2381.5000 CC-CAN
2382.0000 M-US-3
2390.0000 AR-US-1
2390.0000 M-US-3
2395.0000 PR-US-4
2397.0000 M-US-2
2397.0000 M-US-3
2398.0000 G-US-9
2398.0000 M-US-1
2398.0000 PR-US-4
2398.0000 PR-US-6
2398.0000 CC-US-1
2400.0000 M-US-2
2400.0000 M-US-3
2400.0000 CC-US-2
2406.0000 M-US-3
2411.0000 G-US-7
2413.0000 CG-US-8
2414.0000 G-US-7
2419.0000 G-US-7
2419.0000 CC-US-2
2422.0000 G-US-7
2422.0000 PR-US-6
2422.0000 CC-US-2
2423.0000 M-WW-2
2427.0000 CC-US-2
2430.0000 M-US-3
2430.0000 CC-US-2
2434.0000 N-US-1
2436.0000 N-F
2439.0000 G-US-7
2442.0000 CG-US-8
2442.0000 M-US-3
2444.0000 CG-US-3
2445.0000 G-US-1
2446.5000 G-US-2
2447.0000 CC-US-2
2450.0000 G-US-3
2450.0000 M-US-3
2450.0000 CC-US-2
2456.0000 M-US-1
2458.0000 CG-CAN
2458.0000 G-CAN-4
2458.0000 M-US-3
2458.0000 PR-US-6
2463.0000 G-US-7
2463.0000 CC-US-2
2463.5000 G-US-9
2466.0000 G-US-7
2466.0000 M-US-3
2466.0000 CC-US-2
2470.0000 G-AUS
2471.0000 G-US-7
2471.0000 CC-US-2
2474.0000 G-US-7
2474.0000 CC-US-2
2479.0000 CC-US-2
2482.0000 M-US-3
2482.0000 CC-US-2
2484.0000 M-CAN
2487.0000 G-US-7
2488.0000 G-AUS
2490.0000 M-US-3
2500.0000 G-WW-3
2505.0000 SP-US-1
2505.0000 PR-US-1
2506.0000 M-US-3
2506.0000 CC-US-2
2508.0000 G-CAN-2
2508.0000 G-CAN-3
2509.0000 CC-US-2
2510.0000 M-US-1
2510.0000 PR-US-6
2510.0000 PR-US-6
2511.0000 G-US-7
2512.0000 CG-US-8
2512.0000 G-US-4
2512.0000 G-AUS
2512.0000 CC-US-2
2514.0000 CG-CAN
2514.0000 M-US-3
2514.0000 PR-US-6
2522.0000 M-US-3
2524.0000 M-AUS
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2613.0000 G-US-9
2614.0000 G-US-9
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2620.0000 M-WW-2
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2624.0000 SP-US-1
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2632.0000 CC-US-2
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2638.0000 M-US-3
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2638.0000 G-US-9
2638.0000 PR-US-6
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2720.0000 N-AUS
2720.0000 G-AUS
2724.0000 G-US-5
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2727.5000 G-CAN-4
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2730.5000 PR-WW-2
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2748.0000 CG-US-6
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2758.0000 G-US-10
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2776.0000 CC-US-2
2780.0000 G-AUS
2781.0000 CC-US-2
2782.0000 M-US-4
2782.0000 PR-US-6
2784.0000 CC-US-2
2788.0000 G-CAN-1
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2792.0000 PS-AUS
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2801.0000 G-US-7
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2805.0000 PS-AUS
2808.0000 G-AUS
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2810.0000 PR-US-6
2812.0000 G-US-7
2813.5000 AR-US-3
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2830.0000 N-US-3
2830.0000 CG-US-8
2830.0000 M-US-3
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2851.0000 PR-US-6
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2863.0000 A-WW-5
2878.0000 A-US-2
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2971.0000 A-WW-2
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2998.0000 A-WW-2
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3008.0000 A-WW-2
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3010.0000 A-WW-1
3013.0000 A-US-1
3016.0000 A-WW-2
3019.0000 A-US-2
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3023.0000 CG-US-8
3023.5000 N-AUS
3025.0000 N-J

3030.0000	AF-US-2	3235.5000	G-US-10	3347.0000	AR-US-3	3616.0000	PS-CRIB	4053.0000	PS-S
3032.0000	AF-US-2	3237.0000	N-US-1	3353.0000	G-US-10	3625.5000	CG-US-6	4054.0000	AF-US-8
3032.0000	AF-US-2	3237.0000	N-US-3	3354.0000	CC-US-2	3636.5000	N-URS	4055.0000	G-US-10
3032.0000	AF-AUS/NZL	3237.0000	AR-US-3	3354.5000	PR-WW-2	3705.0000	G-WW-3	4055.0000	PS-AUS
3035.0000	N-J	3238.0000	CC-US-2	3357.0000	CC-US-2	3714.0000	G-WW-3	4060.0000	G-US-3
3046.0000	AF-CAN	3238.5000	G-US-6	3359.0000	CC-CAN	3720.0000	G-AUS	4060.0000	G-US-10
3046.0000	AF/N-G	3240.0000	PR-US-6	3362.0000	CC-US-2	3732.0000	PS-AUS	4061.0000	AF-US-8
3050.0000	N-US-1	3240.1000	CG-US-7	3363.0000	G-US-9	3737.0000	N-AFS	4063.0000	M-WW-1
3053.0000	N-US-1	3241.0000	CG-US-2	3365.0000	SP-US-1	3752.0000	P-AUS	4063.0000	M-US-4
3060.0000	AF-US-2	3241.0000	CG-US-8	3365.0000	PR-US-6	3786.1000	CG-US-6	4063.0000	PR-US-6
3067.0000	AF-US-3	3241.0000	CC-US-2	3365.0000	CC-US-2	3786.5000	CG-US-6	4066.1000	N-US-5
3081.0000	AF-US-3	3241.5000	CC-CAN	3367.4000	G-US-1	3798.0000	CG-US-6	4066.1000	M-WW-1
3088.0000	N-US-1	3245.0000	AR-US-3	3368.5000	G-CAN-2	3800.0000	N-AFS	4067.0000	N-G
3092.0000	AF-CAN	3250.0000	N-AFS	3369.0000	AF-US-1	3801.5000	PS-WW-1	4069.2000	CG-CAN
3095.0000	AF/N-G	3253.0000	CG-US-2	3370.5000	AF-US-8	3802.5000	AF-US-8	4069.2000	M-WW-1
3095.0000	AF-SAU	3253.0000	CG-US-8	3375.0000	G-AUS	3810.0000	G-WW-3	4072.0000	PR-US-6
3095.0000	N-US-1	3253.0000	CG-CAN	3379.0000	G-US-1	3815.0000	PS-CRIB	4072.3000	M-WW-1
3102.0000	N-US-3	3253.0000	G-US-10	3380.0000	SP-US-1	3822.0000	G-US-3	4072.4000	M-US-3
3102.0000	PR-US-6	3253.5000	G-CAN-3	3382.0000	CG-US-2	3830.0000	G-US-3	4075.4000	M-US-3
3104.0000	PR-US-6	3256.0000	CG-US-8	3382.0000	CG-US-8	3836.0000	G-AUS	4075.4000	M-WW-1
3109.0000	AF/N-G	3257.0000	AR-US-3	3385.0000	CG-US-1	3841.0000	AF-US-8	4078.5000	M-WW-1
3109.0000	N-US-1	3258.0000	PR-US-6	3385.0000	G-US-5	3842.0000	G-WW-3	4081.5000	G-CAN-3
3113.0000	AF-US-1	3258.0000	CC-US-2	3385.0000	G-US-4	3848.0000	G-AUS	4081.6000	CG-US-8
3113.0000	G-US-1	3260.0000	G-AUS	3385.0000	SP-US-1	3875.0000	AF-US-8	4081.6000	M-WW-1
3116.0000	AF/N-G	3261.0000	N-US-1	3387.0000	CG-US-8	3885.0000	AF/N-G	4082.0000	N-US-1
3116.0000	AF-AFS	3261.0000	AR-US-1	3388.0000	G-US-1	3888.0000	AF-US-8	4084.0000	G-CAN-3
3116.0000	A-WW-5	3261.0000	CC-US-2	3388.8000	G-US-1	3932.0000	AF-AFS	4084.7000	G-US-9
3120.0000	AF/N-G	3265.0000	N-US-1	3389.0000	CG-US-4	3966.0000	AF-US-8	4084.7000	M-WW-1
3120.0000	CG-US-2	3270.0000	CC-CAN	3389.0000	CG-US-3	3978.5000	N-URS	4087.8000	M-US-4
3120.0000	SP-US-1	3273.0000	G-CAN-4	3390.0000	N-AFS	3990.0000	G-US-5	4087.8000	M-WW-1
3123.0000	CG-US-2	3273.5000	AR-US-3	3390.0000	G-US-10	4000.0000	AR-US-1	4090.9000	M-WW-1
3130.0000	AF-AUS/NZL	3276.5000	AR-US-3	3393.0000	G-AUS	4001.0000	N-US-4	4094.0000	M-WW-1
3130.0000	N-US-1	3277.0000	G-US-4	3394.0000	G-US-10	4001.5000	AR-US-1	4097.1000	M-WW-1
3144.0000	AF-US-3	3278.0000	G-CAN-3	3395.0000	G-US-1	4001.5000	AR-US-3	4100.0000	PR-US-6
3152.0000	G-AUS	3281.0000	M-US-1	3395.0000	G-US-10	4001.5000	N-US-4	4100.2000	M-WW-1
3155.0000	G-AUS	3281.0000	PR-US-6	3395.0000	SP-US-1	4004.0000	AR-US-3	4103.3000	M-WW-1
3156.0000	PR-US-1	3287.0000	AR-US-2	3397.5000	CC-CAN	4005.0000	N-US-4	4106.0000	N-URS
3158.0000	G-US-10	3288.5000	M-US-1	3404.0000	A-WW-5	4005.5000	N-URS	4106.4000	CG-US-8
3158.0000	G-AUS	3289.0000	AR-US-3	3407.0000	G-US-9	4007.0000	N-US-4	4106.4000	M-WW-1
3161.5000	G-US-10	3290.0000	AR-US-2	3407.0000	A-WW-5	4008.5000	N-US-4	4109.5000	M-WW-1
3162.0000	SP-US-1	3290.0000	G-AUS	3411.0000	G-US-4	4009.0000	CC-CAN	4110.8000	M-ATN
3164.5000	CC-US-2	3290.5000	M-US-1	3413.0000	A-WW-2	4010.0000	N-URS	4112.6000	M-WW-1
3166.0000	G-CAN-3	3292.0000	AF-US-1	3413.0000	1-WW-5	4010.0000	N-US-4	4115.7000	M-US-4
3167.5000	A-WW-5	3292.0000	AF-US-8	3419.0000	A-WW-2	4010.0000	PS-AUS	4115.7000	M-WW-1
3167.5000	CC-US-2	3294.5000	M-US-1	3425.0000	A-WW-1	4011.0000	N-US-4	4117.2000	M-US-3
3170.0000	N-J	3295.0000	AF-US-1	3432.0000	A-WW-5	4012.0000	AR-US-3	4118.8000	M-WW-1
3170.0000	G-WW-3	3296.0000	AF-US-8	3434.0000	A-US-2	4012.5000	N-US-4	4120.4000	M-US-3
3170.0000	PR-US-4	3296.0000	G-US-4	3443.0000	A-US-2	4013.5000	N-US-4	4121.9000	M-WW-1
3171.0000	CC-CAN	3296.5000	M-US-1	3443.0000	PR-US-6	4014.0000	N-US-1	4125.0000	CG-US-1
3174.5000	G-CAN-3	3299.0000	AF-US-8	3452.0000	A-WW-2	4015.0000	N-US-4	4125.0000	CG-US-8
3175.0000	AR-US-1	3299.5000	CC-CAN	3454.0000	AF-US-8	4016.5000	N-US-4	4125.0000	CG-CAN
3180.0000	CC-US-2	3300.0000	CC-CAN	3458.0000	A-WW-1	4020.0000	AR-US-3	4125.0000	G-US-4
3183.0000	CC-US-2	3300.5000	M-US-1	3460.0000	A-WW-2	4020.0000	G-US-3	4125.0000	M-WW-1
3186.0000	N-G	3302.0000	AR-US-2	3461.0000	A-WW-5	4025.0000	AR-US-3	4125.0000	PR-WW-2
3186.0000	G-US-3	3303.0000	CC-US-2	3467.0000	A-WW-2	4027.0000	G-US-10	4125.0000	PR-US-6
3187.0000	SP-US-1	3303.0000	G-US-1	3470.0000	A-WW-2	4030.0000	AR-US-1	4128.1000	M-WW-1
3191.0000	PR-US-6	3304.5000	G-US-1	3476.0000	A-WW-2	4030.0000	AR-US-3	4130.0000	M-US-3
3191.5000	G-CAN-2	3305.0000	AR-US-2	3479.0000	A-WW-2	4030.0000	G-US-12	4131.2000	M-WW-1
3192.5000	PR-US-1	3306.5000	M-US-1	3485.0000	A-WW-2	4030.0000	PS-AUS	4133.2000	M-CAN
3194.0000	G-US-10	3308.0000	AF-US-8	3485.0000	A-WW-5	4031.0000	N-URS	4134.3000	CG-US-8
3196.0000	G-AUS	3310.0000	G-US-3	3494.0000	A-US-1	4035.0000	AR-US-1	4134.3000	M-WW-1
3198.0000	CC-US-2	3310.0000	CC-CAN	3496.0000	AF-US-8	4035.0000	AR-US-3	4137.4000	G-US-9
3199.5000	G-US-1	3311.0000	AF-US-8	3496.5000	PR-WW-2	4035.0000	CC-US-2	4137.4000	M-WW-1
3201.0000	G-US-4	3311.5000	CC-CAN	3497.0000	A-US-1	4036.5000	CC-CAN	4139.5000	G-US-10
3201.0000	CC-US-2	3312.0000	AF-US-8	3497.0000	A-WW-1	4040.0000	N-US-5	4140.0000	AF/N-G
3205.0000	AR-US-1	3315.0000	AF-US-8	3503.0000	AF-US-3	4040.0000	N-AUS	4140.5000	G-US-9
3206.5000	CC-CAN	3319.0000	N-US-3	3545.0000	AF-US-8	4040.0000	N-AFS	4140.5000	M-WW-1
3209.0000	CG-US-3	3320.4000	M-US-1	3561.0000	N-URS	4040.0000	N-US-4	4140.9000	G-US-9
3213.5000	CC-CAN	3329.5000	G-US-1	3564.5000	N-UTD	4040.0000	PR-US-6	4143.6000	M-WW-1
3214.0000	G-CAN-3	3330.0000	G-WW-3	3565.0000	N-URS	4041.0000	N-US-4	4143.6000	M-WW-2
3214.0000	PR-WW-2	3331.0000	G-US-10	3565.5000	N-URS	4042.5000	N-US-4	4145.0000	M-WW-2
3214.0000	CC-CAN	3333.0000	G-US-9	3566.0000	N-URS	4044.0000	PR-US-6	4145.0000	PR-US-6
3215.0000	G-US-4	3335.0000	G-US-2	3566.5000	N-URS	4045.0000	N-US-1	4152.0000	N-US-1
3223.5000	G-US-4	3336.0000	G-US-10	3567.0000	N-AFS	4045.0000	N-US-4	4164.1000	CG-US-5
3224.0000	CC-CAN	3340.0000	G-AUS	3567.5000	N-URS	4045.0000	PS-AUS	4164.7000	CG-US-5
3228.0000	AF-US-8	3340.0000	PR-US-6	3568.0000	N-URS	4048.0000	G-US-3	4165.0000	CC-CAN
3230.0000	G-US-4	3341.0000	G-US-1	3576.0000	N-URS	4048.5000	CG-US-8	4165.3000	CG-US-5
3231.0000	AF-US-8	3343.0000	G-US-4	3593.0000	G-WW-3	4050.0000	CG-US-6	4169.0000	PR-US-6
3235.5000	AR-US-3	3347.0000	AF-US-8	3607.0000	CG-US-6	4050.0000	G-US-3	4170.0000	CG-US-8

4171.0000	G-CAN-4	4316.0000	CG-US-3	4428.6000	M-US-3	4548.5000	PR-US-4	4672.0000	A-US-2
4172.0000	CG-US-1	4320.0000	M-I	4428.7000	CG-US-7	4549.5000	CG-US-6	4675.0000	A-WW-2
4172.0000	CG-US-4	4325.0000	M-WW-2	4428.7000	CG-US-8	4550.0000	PR-WW-2	4675.0000	A-WW-3
4172.0000	CG-US-3	4331.0000	M-US-3	4428.7000	M-WW-1	4550.1000	CG-US-6	4675.0000	A-WW-5
4172.0000	M-US-3	4335.0000	CG-US-2	4428.7000	G-AUS	4554.0000	G-CAN-2	4678.0000	A-WW-2
4173.5000	G-CAN-4	4340.0000	N-CAN	4428.7000	M-WW-2	4555.0000	BC-WW-1	4687.0000	A-US-1
4174.5000	G-CAN-4	4342.6500	M-US-3	4431.8000	G-US-9	4557.0000	AF-US-8	4687.0000	A-WW-1
4176.0000	CG-US-1	4344.6000	CG-US-7	4431.8000	M-WW-1	4560.0000	AF-US-8	4700.0000	N-US-1
4176.0000	CG-US-4	4346.0000	CG-US-7	4431.8000	M-CAN	4560.0000	PS-AUS	4702.0000	N-US-1
4176.0000	CG-US-3	4346.0000	M-US-3	4433.2000	G-US-9	4565.0000	M-CAN	4703.0000	AF-AUS/NZL
4176.0000	PR-US-6	4347.0000	AF-CAN	4434.9000	G-US-9	4565.0000	BC-WW-1	4703.0000	AF-AFS
4176.5000	M-US-3	4349.0000	M-WW-2	4434.9000	M-WW-1	4568.4000	N-US-3	4704.0000	AF-CAN
4177.0000	M-US-3	4350.0000	PS-AUS	4435.0000	G-US-3	4571.0000	G-AUS	4704.0000	N-US-1
4177.5000	CG-US-3	4351.5000	CG-US-1	4438.0000	PR-US-1	4572.0000	G-US-10	4704.0000	SP-US-1
4177.5000	CG-US-8	4351.5000	CG-US-4	4438.0000	PR-US-6	4572.5000	G-US-1	4705.5000	AF-US-7
4178.0000	CG-US-4	4351.5000	CG-US-3	4441.0000	G-CAN-2	4573.0000	CG-US-6	4707.0000	N-US-1
4178.0000	CG-US-3	4351.5000	M-US-3	4444.0000	G-WW-3	4573.5000	G-CAN-3	4710.0000	A-WW-5
4178.0000	M-US-3	4353.0000	CG-CAN	4446.5000	AR-US-3	4573.5000	PR-WW-2	4710.5000	N-US-1
4178.0000	PR-US-6	4353.0000	G-CAN-4	4447.0000	AF-US-8	4573.5000	CC-CAN	4711.0000	N-US-1
4178.5000	CG-US-3	4354.0000	G-CAN-4	4448.0000	CC-CAN	4574.0000	G-AUS	4714.0000	SP-US-1
4179.0000	CG-US-4	4355.5000	CG-US-1	4448.5000	N-URS	4575.0000	AF-US-8	4718.0000	N-US-3
4179.0000	CG-US-3	4355.5000	CG-US-4	4449.0000	AF-US-2	4575.0000	N-J	4719.0000	AF/N-G
4181.8000	CG-US-1	4355.5000	CG-US-3	4449.0000	AF-US-1	4575.0000	CG-US-2	4721.0000	AF-US-3
4182.2000	CG-US-1	4356.0000	M-US-3	4450.0000	AF-US-8	4575.0000	CG-US-4	4722.0000	AF/N-G
4189.5000	CG-US-1	4356.5000	M-US-3	4450.0000	G-AUS	4575.0000	CG-US-6	4725.0000	AF-US-1
4190.0000	PR-US-6	4357.4000	M-WW-1	4455.0000	PR-WW-2	4575.0000	PR-US-4	4730.0000	AF-CAN
4195.0000	G-US-11	4359.0000	N-US-1	4457.0000	AF-US-5	4577.0000	AF-US-8	4730.0000	AF/N-G
4198.0000	CG-US-1	4360.0000	N-US-5	4460.0000	C-CAN-2	4580.0000	G-CAN-2	4730.0000	N-US-1
4205.0000	CG-US-1	4360.5000	M-WW-1	4462.0000	G-CAN-2	4582.0000	AF-US-7	4732.0000	AF/N-G
4213.5000	G-US-9	4360.5000	N-US-5	4463.0000	G-US-3	4585.0000	AF-US-7	4735.0000	N-US-1
4225.0000	AF-CAN	4363.6000	CG-CAN	4464.5000	AF-US-7	4588.5000	AF-US-8	4742.0000	AF-US-2
4225.0000	PR-US-6	4363.6000	M-WW-1	4465.0000	CC-CAN	4589.0000	G-US-3	4742.0000	AF/N-G
4228.0000	M-US-3	4365.0000	AR-US-1	4465.0000	BC-WW-1	4590.0000	AF-US-8	4746.0000	AF-US-3
4229.0000	M-WW-2	4366.7000	M-WW-1	4466.0000	AF-US-8	4593.5000	AF-US-8	4747.0000	AF-US-3
4230.0000	CG-US-4	4369.8000	M-US-3	4467.5000	AF-US-7	4596.0000	G-US-3	4752.0000	AF-CAN
4232.0000	CG-US-3	4369.8000	M-WW-1	4468.0000	G-US-3	4599.5000	AF-US-7	4755.0000	SP-US-1
4233.0000	AR-US-1	4369.8000	M-WW-2	4470.5000	N-US-4	4600.0000	G-US-2	4758.0000	AF-US-8
4235.0000	CG-US-3	4371.0000	M-US-3	4472.0000	N-US-4	4602.5000	AF-US-7	4760.0000	AF-US-5
4235.0000	CG-CAN	4372.9000	M-WW-1	4474.0000	G-CAN-2	4602.6000	AF-US-8	4760.0000	SP-US-1
4236.5000	CG-CAN	4373.0000	N-US-1	4475.0000	G-US-10	4603.0000	PR-WW-2	4765.0000	AF-US-8
4238.0000	M-US-3	4376.0000	CG-US-8	4475.0000	BC-WW-1	4603.0000	CC-CAN	4765.0000	G-CAN-1
4240.0000	M-WW-2	4376.0000	CG-CAN	4476.0000	G-US-10	4610.0000	AR-US-1	4765.0000	G-CAN-2
4245.0000	CG-US-3	4376.0000	M-WW-1	4477.0000	AF/N-G	4610.0000	G-US-10	4766.5000	M-CAN
4245.0000	M-WW-2	4377.0000	N-US-1	4480.0000	G-US-3	4610.0000	CC-CAN	4768.0000	N-US-3
4247.0000	M-US-3	4379.1000	CG-CAN	4480.5000	G-US-2	4610.5000	PR-US-4	4769.0000	G-CAN-4
4250.0000	AR-US-1	4379.1000	G-US-9	4483.0000	G-US-8	4613.5000	PR-US-4	4776.5000	G-US-2
4250.0000	M-US-3	4379.1000	M-WW-1	4486.0000	SP-US-1	4616.0000	G-US-12	4776.5000	G-CAN-1
4250.0000	M-WW-2	4380.0000	G-US-9	4491.0000	N-US-1	4617.0000	G-US-6	4780.0000	AR-US-1
4253.0000	N-US-1	4382.2000	M-WW-1	4492.0000	AF-US-1	4621.5000	PR-WW-2	4780.0000	G-US-1
4255.0000	CG-CAN	4385.3000	CG-CAN	4495.0000	AF-US-1	4622.5000	N-US-1	4785.0000	G-CAN-1
4255.6000	M-WW-2	4385.3000	M-WW-1	4496.5000	G-CAN-2	4625.0000	G-WW-3	4791.5000	CC-US-2
4256.0000	M-US-3	4388.4000	M-WW-1	4500.0000	AF-US-8	4625.0000	N-US-4	4792.5000	M-US-2
4260.0000	CG-CAN	4391.5000	M-WW-1	4500.0000	G-US-3	4625.5000	G-CAN-2	4797.0000	PR-US-6
4262.0000	CG-US-3	4394.6000	M-WW-1	4500.0000	G-WW-3	4626.0000	G-US-3	4797.0000	PR-US-7
4262.0000	M-WW-2	4397.7000	M-WW-1	4500.0000	SP-US-1	4627.0000	AF-US-7	4797.0000	CC-US-1
4263.5000	AR-US-1	4400.8000	CG-US-8	4504.5000	AF-US-7	4630.0000	AF-US-7	4798.5000	G-CAN-1
4268.0000	M-US-3	4400.8000	M-WW-1	4505.0000	BC-WW-1	4630.0000	M-J	4803.5000	N-US-4
4268.0000	M-WW-2	4403.9000	M-WW-1	4507.5000	AF-US-7	4630.5000	CC-CAN	4805.5000	N-US-4
4269.0000	M-WW-2	4404.4000	G-US-9	4510.0000	G-CAN-2	4632.5000	G-WW-3	4808.0000	G-US-3
4271.0000	AF-CAN	4407.0000	M-WW-1	4510.0000	SP-US-1	4633.0000	AF-US-8	4812.0000	AF-US-5
4274.0000	M-US-3	4409.4000	M-ATN	4515.0000	N-US-1	4634.5000	PR-WW-2	4812.5000	G-CAN-1
4275.5000	M-WW-2	4410.0000	G-AUS	4517.0000	AF-US-8	4634.5000	PR-US-4	4813.5000	N-US-5
4276.0000	M-J	4410.0000	M-US-4	4520.0000	AR-US-1	4635.0000	PS-AUS	4815.0000	AF-US-8
4277.0000	AF-US-3	4410.1000	CG-CAN	4520.0000	G-CAN-2	4637.5000	PR-WW-2	4820.0000	N-US-4
4277.0000	M-WW-2	4410.1000	M-US-4	4523.5000	N-URS	4637.5000	PR-US-4	4820.0000	CC-CAN
4280.0000	AR-US-1	4410.1000	M-WW-1	4524.0000	G-AUS	4638.0000	AF-US-8	4821.0000	G-US-1
4283.0000	M-WW-2	4413.2000	M-WW-1	4525.0000	G-WW-3	4640.0000	AR-US-1	4825.0000	SP-US-1
4285.0000	CG-CAN	4415.0000	AR-US-1	4529.0000	M-US-3	4647.0000	PR-US-4	4826.5000	N-US-4
4286.0000	G-WW-3	4415.8000	M-US-3	4530.0000	G-US-3	4654.0000	A-US-1	4832.0000	AF-US-8
4290.0000	AR-US-1	4416.0000	N-US-1	4531.0000	CG-US-6	4654.0000	A-WW-1	4835.0000	N-US-1
4291.0000	G-WW-3	4416.3000	M-WW-1	4532.0000	G-CAN-2	4657.0000	A-WW-1	4837.0000	CC-CAN
4292.0000	M-US-3	4419.0000	M-US-3	4532.0000	M-US-3	4663.0000	A-WW-4	4837.5000	G-WW-3
4292.0000	M-I	4419.0000	PR-US-6	4535.0000	G-CAN-2	4665.0000	A-WW-3	4840.0000	AR-US-1
4294.0000	M-US-3	4419.4000	CG-US-8	4535.0000	M-US-3	4666.0000	A-WW-2	4840.0000	G-US-3
4296.1000	CG-US-7	4419.4000	M-WW-1	4538.0000	M-US-3	4666.0000	M-CAN	4840.0000	G-CAN-3
4298.0000	CG-US-4	4419.4000	M-WW-2	4538.5000	PR-US-4	4667.0000	A-WW-5	4842.0000	AF-US-8
4298.0000	CG-US-3	4419.4000	PR-WW-2	4540.0000	N-J	4668.0000	A-WW-5	4850.0000	AR-US-2
4298.0000	G-WW-3	4422.5000	M-WW-1	4543.5000	CC-CAN	4669.0000	A-WW-2	4855.5000	G-WW-3
4310.0000	M-US-3	4425.6000	M-WW-1	4548.0000	G-US-3	4669.5000	G-US-2	4857.5000	CG-US-6

4860.0000	SP-US-1	5066.0000	CG-US-6	5224.0000	AF-US-6	5377.5000	G-US-2	5544.0000	A-WW-1
4860.0000	PS-AUS	5067.5000	PR-US-4	5226.0000	CG-US-6	5379.0000	G-US-3	5546.0000	G-US-3
4861.5000	G-CAN-2	5074.5000	PR-US-4	5227.0000	PS-AUS	5380.0000	G-CAN-4	5547.0000	A-WW-2
4861.5000	G-CAN-4	5079.0000	M-US-3	5230.0000	PS-AUS	5384.5000	CG-US-3	5550.0000	A-WW-2
4863.0000	G-US-4	5080.0000	N-US-1	5230.8000	BC-WW-1	5385.0000	N-US-5	5559.0000	CC-US-1
4865.0000	CC-CAN	5080.0000	N-US-3	5235.0000	AR-US-1	5388.5000	G-US-12	5561.0000	A-WW-5
4870.0000	AR-US=1	5080.0000	CG-US-1	5235.0000	SP-US-1	5390.0000	G-CAN-3	5562.0000	G-US-9
4872.0000	AF-US-8	5082.0000	M-US-3	5240.0000	G-CAN-2	5390.0000	BC-WW-1	5568.0000	A-WW-2
4873.0000	N-US-3	5085.0000	G-US-10	5242.5000	AF-US-6	5396.0000	AR-US-3	5571.0000	A-US-2
4878.0000	AF-US-8	5085.0000	M-US-3	5242.5000	G-US-4	5396.0000	G-CAN-3	5571.0000	PR-US-6
4880.0000	G-US-3	5088.0000	M-US-3	5243.0000	AF-US-1	5396.0000	M-US-2	5574.0000	A-WW-2
4880.0000	G-CAN-2	5090.0000	AR-US-1	5245.0000	A-WW-3	5397.0000	AR-US-1	5575.0000	A-WW-5
4880.0000	G-AUS	5099.0000	PR-US-4	5246.0000	AF-US-6	5398.0000	G-US-3	5580.0000	A-WW-5
4880.0000	PS-AUS	5100.0000	PR-US-6	5246.0000	SP-US-1	5400.0000	N-AUS	5598.0000	A-WW-2
4882.0000	AF-US-8	5102.0000	PR-US-4	5248.5000	CC-CAN	5400.0000	N-NZL	5601.0000	A-WW-1
4883.0000	CG-US-6	5104.0000	G-WW-3	5250.0000	G-US-3	5400.0000	AR-US-2	5601.0000	A-WW-5
4883.5000	G-CAN-2	5107.5000	G-CAN-3	5250.0000	PR-US-6	5401.0000	AR-US-3	5616.0000	A-WW-2
4885.0000	AF-US-8	5110.0000	G-US-3	5251.0000	PR-US-6	5402.0000	G-US-1	5628.0000	A-WW-2
4885.0000	AR-US-1	5110.0000	PS-AUS	5255.0000	G-US-1	5402.0000	G-US-10	5631.0000	G-US-10
4885.0000	G-CAN-4	5110.0000	AF-US-1	5260.0000	PS-AUS	5405.0000	CC-CAN	5634.0000	A-WW-2
4886.0000	G-US-3	5110.0000	PS-AUS	5270.0000	G-US-3	5410.0000	G-US-3	5640.0000	A-WW-5
4886.0000	G-US-3	5113.0000	G-US-3	5270.0000	PR-US-6	5410.0000	G-CAN-3	5643.0000	G-US-3
4886.5000	G-CAN-4	5115.0000	AR-US-3	5270.5000	G-US-3	5410.0000	PS-AUS	5643.0000	A-WW-2
4895.0000	AR-US-1	5115.0000	N-US-4	5276.5000	G-CAN-3	5411.0000	CC-CAN	5645.0000	PR-WW-2
4896.0000	AF-US-1	5115.5000	G-CAN-4	5280.0000	A-WW-5	5419.5000	CG-US-8	5646.0000	A-WW-2
4898.0000	AR-US-1	5116.5000	PR-WW-2	5281.5000	CC-CAN	5422.0000	CG-US-6	5649.0000	A-WW-2
4898.0000	G-CAN-3	5120.0000	A-WW-3	5283.0000	PR-WW-2	5422.5000	CG-US-1	5652.0000	A-WW-1
4900.0000	G-US-3	5123.0000	CG-US-6	5286.0000	G-US-10	5424.0000	G-US-1	5652.0000	A-WW-2
4900.0000	SP-US-1	5124.0000	G-CAN-2	5287.5000	CG-US-4	5426.0000	G-US-3	5655.0000	A-WW-2
4902.0000	G-US-1	5125.0000	G-US-3	5287.5000	G-US-4	5430.0000	N-US-1	5658.0000	A-WW-2
4903.0000	G-US-3	5125.0000	BC-WW-1	5289.5000	CC-CAN	5430.0000	G-CAN-3	5661.0000	A-WW-2
4910.0000	G-US-3	5130.0000	PS-AUS	5290.0000	BC-WW-1	5431.0000	G-US-3	5664.0000	A-WW-2
4912.0000	AF-US-8	5133.0000	G-US-8	5295.0000	BC-WW-1	5434.0000	BC-WW-1	5666.0000	A-WW-2
4926.0000	PS-AUS	5134.0000	CC-CAN	5297.0000	AF-US-4	5436.0000	SP-US-1	5667.0000	A-WW-2
4927.5000	G-CAN-4	5134.5000	CC-US-2	5300.0000	G-US-3	5436.5000	CC-CAN	5676.0000	A-WW-5
4940.0000	PS-AUS	5135.0000	G-US-7	5300.0000	PS-AUS	5437.0000	AR-US-2	5680.0000	AF-AFS
4946.5000	G-US-2	5135.0000	CC-US-2	5300.0000	PR-US-6	5441.5000	CC-CAN	5680.0000	N-US-1
4950.0000	G-CAN-3	5137.5000	CC-US-2	5302.0000	N-NOR	5443.0000	G-US-3	5680.0000	CG-CAN
4964.5000	CC-CAN	5140.0000	G-CAN-3	5305.0000	G-US-3	5445.0000	G-CAN-1	5680.0000	CG-US-1
4965.0000	G-US-1	5140.0000	G-US-7	5305.5000	N-URS	5445.0000	PS-AUS	5680.0000	CG-US-2
4967.0000	G-CAN-3	5145.0000	PS-AUS	5305.5000	G-WW-3	5446.0000	N-US-1	5680.0000	CG-US-8
4971.1000	M-CAN	5149.0000	CC-CAN	5306.0000	N-URS	5450.0000	AF/N-G	5684.0000	AF-US-1
4980.0000	PS-AUS	5150.0000	G-US-5	5306.5000	N-URS	5450.0000	N-F	5688.0000	AF-US-3
4982.0000	G-CAN-2	5150.0000	G-US-4	5307.0000	N=URS	5450.0000	G-US-3	5688.0000	AF-AUS/NZL
4983.0000	M-US-5	5159.5000	N-US-4	5307.5000	N-URS	5450.0000	G-AUS	5690.0000	AF-CAN
4990.0000	G-CAN-4	5161.0000	G-US-10	5308.0000	N-URS	5451.0000	A-US-2	5691.0000	AF-D
4991.0000	PR-US-6	5162.5000	G-US-10	5308.0000	G-US-2	5455.0000	BC-WW-1	5691.0000	A-WW-5
4992.0000	SP-US-1	5164.5000	CC-US-2	5308.5000	N-URS	5460.0000	BC-WW-1	5692.0000	CG-US-2
4996.0000	G-WW-3	5167.5000	G-US-4	5309.0000	N-URS	5463.0000	A-US-2	5695.0000	AF-AUS/NZL
5000.0000	G-WW-3	5167.5000	CC-US-2	5313.0000	CG-US-8	5469.0000	A-US-2	5695.0000	AF-AFS
5004.0000	G-WW-3	5170.0000	G-CAN-2	5313.5000	CC-CAN	5469.0000	PR-US-6	5695.5000	AF/N-G
5005.0000	PR-US-1	5171.0000	AF-US-1	5313.0000	PR-US-4	5470.0000	G-US-3	5696.0000	N-US-3
5005.0000	PR-US-6	5180.0000	SP-US-1	5315.5000	CG-US-6	5470.0000	G-US-5	5696.0000	CG-US-2
5008.0000	G-US-1	5181.0000	G-CAN-3	5317.0000	CG-US-6	5470.0000	BC-WW-1	5700.0000	AF-US-1
5009.0000	G-CAN-3	5186.6000	CC-CAN	5320.0000	CG-US-2	5475.0000	G-US-3	5700.0000	SP-US-1
5009.0000	M-US-2	5190.0000	SP-US-1	5320.0000	CG-US-3	5475.0000	A-WW-5	5703.0000	AF-US-2
5010.0000	G-US-10	5192.0000	G-US-7	5320.0000	CG-US-6	5475.0000	M-WW-2	5703.0000	AF-US-3
5010.0000	PS-AUS	5194.0000	G-US-3	5320.0000	CG-US-8	5490.0000	A-WW-3	5703.0000	AF-US-1
5011.0000	AR-US-2	5195.0000	G-US-4	5326.0000	G-US-6	5490.0000	N-J	5703.0000	AF-US-5
5013.5000	G-CAN-2	5195.0000	G-US-7	5327.0000	AR-US-2	5493.0000	A-WW-2	5703.0000	AF-CAN
5015.0000	AR-US-2	5195.0000	BC-WW-1	5328.0000	AF-US-1	5498.0000	A-WW-2	5707.0000	AF-AUS/NZL
5020.0000	AF-US-1	5197.0000	AF-US-3	5330.0000	G-US-1	5498.0000	A-WW-5	5710.0000	AF-US-3
5024.5000	G-US-1	5200.0000	PS-AUS	5341.5000	G-CAN-2	5499.0000	A-WW-5	5710.0000	A-WW-1
5026.0000	AF-US-1	5204.0000	G-US-3	5345.0000	G-AUS	5508.0000	A-US-2	5716.5000	N-US-1
5031.0000	G-US-1	5204.5000	CC-US-2	5346.0000	AR-US-2	5526.0000	AF-SAU	5718.0000	AF-CAN
5031.0000	G-CAN-2	5205.0000	G-US-5	5346.5000	G-CAN-2	5526.0000	A-WW-2	5718.0000	N-US-1
5031.0000	G-CAN-3	5207.5000	CC-US-2	5347.5000	G-CAN-2	5529.0000	A-US-1	5724.0000	N-US-1
5046.5000	PR-US-4	5208.0000	AR-US-3	5350.0000	G-US-1	5529.0000	A-WW-1	5725.0000	G-US-3
5052.5000	PR-US-4	5208.0000	G-WW-3	5350.0000	SP-US-1	5532.0000	A-US-1	5726.0000	N-US-3
5053.0000	G-CAN-2	5211.0000	G-US-1	5355.0000	PS-AUS	5532.0000	A-WW-1	5729.0000	AF/N-G
5055.5000	PR-US-4	5212.5000	G-US-2	5357.5000	G-US-10	5535.0000	A-US-1	5730.0000	G-CAN-3
5058.5000	G-US-12	5215.0000	AF-US-1	5360.0000	PS-AUS	5535.0000	A-WW-1	5730.0000	PR-US-1
5060.0000	SP-US-1	5215.0000	G-CAN-3	5362.5000	G-US-10	5536.5000	A-WW-1	5730.0000	PR-US-6
5060.0000	PR-US-1	5217.0000	AR-US-3	5370.0000	G-AUS	5538.0000	A-US-1	5731.0000	G-US-3
5060.0000	PR-US-6	5220.0000	G-US-3	5370.0000	PS-AUS	5538.0000	A-WW-1	5731.0000	PS-AUS
5061.5000	CC-CAN	5220.0000	G-US-10	5370.0000	CC-US-2	5540.0000	G-CAN-2	5732.0000	G-US-3
5061.5000	PR-US-4	5222.5000	G-CAN-3	5370.5000	AF-US-6	5541.0000	A-US-1	5733.0000	SP-US-1
5063.0000	CG-US-6	5222.5000	M-US-2	5373.0000	G-US-8	5541.0000	A-WW-1	5735.0000	PS-AUS
5063.6000	CG-US-6	5224.0000	SG-UD-6	5374.7000	PR-WW-2	5544.0000	A-US-1	5735.0000	BC-WW-1

5736.5000	PR-US-1	5960.0000	CC-US-1	6269.0000	CG-US-3	6497.5000	G-CAN-4	6687.0000	AF-AFS
5740.0000	AF-US-8	5961.0000	G-US-1	6269.5000	CG-US-4	6498.5000	M-WW-2	6693.0000	AF-CAN
5740.0000	PS-AUS	5985.0000	PR-US-6	6269.5000	CG-US-3	6500.0000	CG-US-1	6693.0000	AF/N-G
5742.5000	BC-WW-1	5987.0000	AF-US-1	6272.7000	CG-US-1	6500.0000	CG-US-3	6693.0000	N-US-1
5745.0000	AF-US-5	5997.0000	AR-US-1	6273.3000	CG-US-1	6500.5000	M-US-3	6693.0000	A-WW-5
5745.0000	CG-US-6	6020.0000	AR-US-2	6274.0000	N-AFS	6503.5000	G-US-9	6697.0000	N-US-1
5749.0000	G-US-1	6040.0000	A-US-1	6284.2500	CG-US-1	6504.0000	CG-US-1	6699.5000	AF-AUS/NZL
5751.0000	G-US-2	6049.0000	G-US-1	6285.0000	PR-US-6	6504.0000	CG-US-4	6700.5000	AF-PHL
5755.0000	G-US-3	6060.0000	PR-US-6	6292.5000	CG-CAN	6504.0000	CG-US-3	6705.0000	AF-CAN
5755.5000	G-US-1	6060.0000	CC-US-1	6297.0000	CG-US-1	6504.5000	M-US-3	6705.0000	AF/N-G
5758.0000	N-URS	6100.0000	AF-US-5	6320.2500	G-US-9	6505.5000	M-WW-2	6705.0000	N-US-1
5760.0000	AR-US-3	6100.0000	G-WW-3	6326.5000	M-US-3	6506.0000	M-WW-2	6706.0000	G-US-3
5760.0000	PR-US-6	6100.0000	PR-US-6	6330.0000	AF-CAN	6506.4000	CG-US-7	6706.4000	CG-US-7
5760.0000	CC-US-1	6106.0000	G-US-1	6333.5000	M-US-3	6506.4000	CG-US-8	6707.0000	AF/N-G
5760.0000	BC-WW-1	6108.0000	G-US-1	6333.5000	M-WW-2	6506.4000	M-WW-1	6708.0000	AF-CAN
5765.0000	CG-US-3	6147.5000	M-US-3	6335.5000	CG-CAN	6506.4000	M-WW-2	6708.0000	AF/N-G
5775.0000	SP-US-1	6151.0000	G-US-1	6339.0000	PR-US-6	6509.5000	G-US-9	6708.0000	N-US-1
5785.0000	N-NZL	6153.0000	PR-US-6	6340.5000	CG-US-4	6509.5000	M-WW-1	6708.0000	N-US-3
5790.0000	BC-WW-1	6153.0000	CC-US-1	6340.5000	CG-US-3	6509.6000	M-WW-2	6712.0000	AF-US-1
5793.5000	G-US-3	6158.8000	CG-CAN	6341.0000	CG-US-2	6512.6000	CG-US-8	6712.0000	AF-US-3
5795.0000	G-CAN-4	6160.0000	PR-US-6	6344.0000	CG-US-3	6512.6000	CG-CAN	6714.0000	AF-US-5
5797.5000	N-US-4	6160.0000	CC-US-1	6348.0000	M-US-3	6512.6000	M-WW-1	6715.0000	AF-US-5
5803.0000	CG-CAN	6171.0000	PR-US-6	6351.5000	M-US-3	6512.6000	M-WW-2	6716.0000	AF-CAN
5803.0000	A-WW-5	6172.5000	CC-US-1	6355.0000	CG-US-4	6515.7000	CG-CAN	6720.0000	AF-AUS/NZL
5805.0000	AF-US-5	6174.0000	PR-US-6	6361.0000	M-WW-2	6515.7000	M-US-4	6720.0000	N-US-1
5805.0000	G-US-10	6174.5000	PR-US-6	6364.5000	M-WW-2	6515.7000	M-WW-1	6723.0000	AF-AUS/NZL
5806.0000	G-US-3	6176.0000	G-US-1	6365.5000	M-US-3	6516.8000	G-US-9	6723.0000	N-US-1
5810.0000	N-US-3	6200.0000	CG-US-8	6369.0000	M-US-3	6518.8000	CG-CAN	6726.0000	G-US-3
5810.0000	SP-US-1	6200.0000	M-WW-1	6372.5000	M-WW-2	6518.8000	M-US-4	6727.0000	AF-US-3
5810.0000	CC-CAN	6200.0000	M-WW-2	6376.0000	M-US-3	6518.8000	M-WW-1	6730.0000	AF-US-2
5810.0000	BC-WW-1	6200.0000	PR-US-6	6381.0000	CG-US-2	6521.9000	CG-US-8	6730.0000	AF-US-3
5811.5000	G-CAN-2	6203.1000	G-US-9	6381.0000	CG-US-8	6521.9000	M-WW-1	6730.0000	AF/N-G
5811.5000	G-CAN-4	6203.1000	M-WW-1	6382.2200	M-WW-2	6521.9000	M-WW-2	6730.0000	A-WW-5
5815.0000	BC-WW-1	6206.2000	CG-US-8	6383.0000	CG-US-1	6522.0000	PR-US-6	6738.0000	AF-US-3
5821.0000	G-US-1	6206.2000	M-WW-1	6383.0000	M-WW-2	6525.0000	AF-PHL	6738.0000	AF/N-G
5822.0000	SP-US-1	6209.3000	M-US-4	6386.5000	M-WW-2	6532.0000	A-WW-2	6740.0000	AF-US-2
5822.5000	G-US-3	6209.3000	M-WW-1	6389.6500	M-US-3	6535.0000	A-WW-2	6741.0000	AF/N-G
5826.0000	AF-US-1	6211.8000	G-US-9	6390.0000	BC-WW-1	6538.0000	A-WW-5	6742.0000	N-US-1
5827.0000	AF-US-5	6212.4000	M-US-4	6393.0000	G-US-9	6550.0000	A-US-2	6746.0000	AF-CAN
5830.0000	G-US-3	6212.4000	M-WW-1	6393.5000	M-WW-2	6550.0000	PR-US-6	6746.0000	N-US-1
5830.0000	BC-WW-1	6215.5000	CG-US-1	6397.0000	N-US-3	6550.0000	BC-WW-1	6748.0000	A-URS
5835.0000	AF-AUS/NZL	6215.5000	M-WW-1	6397.0000	G-US-9	6553.0000	A-WW-1	6750.0000	AF-US-3
5841.0000	PR-US-6	6215.5000	M-WW-2	6400.5000	M-WW-2	6556.0000	A-WW-2	6750.0000	SP-US-1
5845.0000	PS-AUS	6218.6000	CG-US-4	6404.0000	M-US-3	6559.0000	A-WW-1	6751.0000	AF/N-G
5845.0000	BC-WW-1	6218.6000	CG-US-8	6406.0000	M-WW-2	6562.0000	AF/N-G	6753.0000	AF-US-3
5850.0000	AR-US-1	6218.6000	M-WW-1	6407.5000	M-WW-2	6571.0000	A-WW-2	6753.0000	AF-US-2
5850.0000	PS-AUS	6218.6000	M-WW-2	6409.5000	M-I	6574.0000	A-WW-1	6753.0000	AF-CAN
5856.0000	G-US-3	6220.0000	PR-US-6	6411.3500	M-US-3	6575.0000	A-WW-2	6753.0000	SP-US-1
5856.0000	G-CAN-3	6221.6000	CG-US-8	6414.5000	M-US-3	6577.0000	A-WW-2	6754.0000	G-US-3
5856.0000	M-US-2	6221.6000	CG-CAN	6416.0000	M-US-3	6580.0000	A-WW-5	6756.0000	AF-US-3
5860.0000	G-US-10	6221.6000	M-WW-1	6418.2000	M-I	6592.0000	A-WW-2	6757.0000	AF-US-3
5865.0000	N-US-4	6223.0000	G-US-11	6421.5000	CG-US-4	6594.0000	G-US-12	6761.0000	AF-US-1
5865.0000	PS-AUS	6245.5000	N-URS	6421.5000	CG-US-3	6598.0000	A-WW-2	6762.0000	G-US-3
5868.0000	G-US-3	6246.1000	CG-US-5	6430.0000	CG-CAN	6600.0000	N-NOR	6765.0000	G-US-3
5875.0000	BC-WW-1	6246.7000	CG-US-5	6432.0000	M-WW-2	6603.0000	A-WW-5	6765.0000	PR-US-1
5875.5000	CG-CAN	6247.0000	CC-CAN	6435.5000	M-I	6604.0000	A-WW-5	6766.0000	AR-US-3
5880.0000	BC-WW-1	6247.3000	CG-US-5	6441.0000	M-WW-2	6610.0000	N-AUS	6769.0000	AF-US-5
5885.0000	G-CAN-4	6252.0000	PR-US-6	6450.0000	AF-CAN	6617.0000	A-WW-5	6770.0000	BC-WW-1
5895.0000	G-WW-3	6258.0000	CG-US-1	6452.0000	AF-CAN	6631.0000	A-WW-2	6771.0000	N-URS
5895.0000	PS-AUS	6258.0000	CG-US-4	6455.0000	M-US-3	6637.0000	A-US-1	6771.0000	G-US-3
5906.0000	G-US-10	6258.0000	CG-US-3	6457.0000	CG-US-4	6637.0000	A-WW-1	6771.5000	G-CAN-2
5912.5000	G-US-6	6258.5000	M-US-3	6460.0000	AR-US-1	6640.0000	A-US-1	6775.0000	AF-US-8
5913.0000	G-US-12	6259.5000	G-CAN-4	6464.0000	M-WW-2	6643.0000	A-US-1	6776.0000	G-US-10
5915.0000	PS-AUS	6260.0000	CG-US-8	6467.0000	CG-US-4	6643.0000	A-WW-1	6780.0000	AF-US-9
5916.5000	PR-WW-2	6260.5000	G-CAN-4	6467.0000	CG-US-3	6646.0000	A-US-1	6780.0000	N-AFS
5920.0000	A-US-1	6262.0000	CG-US-1	6467.0000	M-WW-2	6646.5000	G-US-2	6780.0000	G-US-3
5920.0000	BC-WW-1	6262.0000	CG-US-3	6470.0000	BC-WW-1	6649.0000	A-WW-2	6780.0000	PR-US-3
5924.0000	G-US-3	6262.5000	M-US-3	6474.0000	CG-US-3	6655.0000	A-WW-2	6783.5000	G-US-6
5925.0000	G-US-4	6265.6000	G-US-9	6475.5000	G-WW-3	6669.0000	CC-US-1	6785.0000	AR-US-2
5925.0000	G-US-9	6266.0000	CG-US-1	6477.5000	CG-US-3	6673.0000	G-US-9	6785.0000	PS-AUS
5925.0000	G-US-10	6266.0000	CG-US-4	6477.5000	M-US-3	6673.0000	A-WW-1	6787.0000	G-US-3
5925.0000	CC-CAN	6266.0000	CG-US-3	6491.5000	CG-US-3	6676.0000	AF-AUS/NZL	6788.5000	G-US-3
5940.0000	CG-CAN	6266.5000	M-US-3	6491.5000	CG-CAN	6676.0000	A-WW-5	6790.0000	AR-US-2
5940.0000	N-J	6267.5000	CG-US-8	6493.0000	CG-CAN	6679.0000	A-WW-5	6790.0000	CC-CAN
5945.0000	G-US-10	6268.0000	CG-US-3	6496.0000	CG-US-1	6680.0000	A-WW-5	6792.0000	G-WW-3
5947.0000	N-J	6268.0000	PR-US-6	6496.0000	CG-US-4	6680.0000	AF-US-1	6792.0000	G-CAN-1
5947.0000	G-US-2	6268.4000	CG-US-3	6496.0000	CG-US-3	6680.0000	N-US-4	6795.0000	G-US-3
5950.0000	PR-US-6	6268.5000	CG-US-4	6496.5000	M-US-3	6683.0000	AF-US-3	6799.0000	N-US-1
5960.0000	PR-US-6	6268.5000	M-US-3	6497.5000	CG-CAN	6686.0000	AF/N-G	6799.0000	G-US-3

6800.0000	AF-US-5	6919.0000	SP-US-1	7326.5000	M-CAN	7470.0000	BC-WW-1	7647.0000	G-US-3
6800.0000	G-US-3	6920.0000	PS-AUS	7329.0000	AF-US-8	7473.0000	CG-US-6	7648.5000	BC-WW-1
6800.0000	PR-US-4	6925.0000	G-US-3	7330.0000	AF-US-1	7474.0000	G-US-3	7651.0000	BC-WW-1
6800.0000	PS-WW-1	6925.0000	PS-AUS	7331.0000	AF-US-8	7475.0000	G-US-10	7652.0000	G-US-3
6801.5000	N-URS	6925.5000	G-US-3	7335.0000	G-WW-3	7475.0000	PS-AUS	7653.5000	BC-WW-1
6802.0000	N-URS	6928.0000	G-US-3	7340.0000	N-US-3	7477.0000	G-US-7	7655.0000	PR-US-6
6802.0000	G-US-3	6930.5000	G-US-2	7340.0000	PS-AUS	7478.0000	BC-WW-1	7657.0000	PR-US-6
6802.5000	N-URS	6935.0000	CG-US-6	7346.5000	N-US-4	7480.0000	G-US-7	7658.5000	CC-CAN
6803.0000	N-URS	6936.0000	G-US-3	7347.5000	G-CAN-2	7480.0000	PR-US-4	7660.0000	PS-AUS
6803.0000	G-US-3	6937.0000	SP-US-1	7348.0000	G-US-1	7483.0000	PR-US-4	7662.0000	G-US-3
6803.0000	PR-US-4	6940.0000	AF-US-5	7349.5000	CG-US-8	7484.0000	G-CAN-4	7665.0000	N-URS
6803.5000	N-URS	6940.0000	G-AUS	7349.5000	G-US-2	7486.0000	PR-US-4	7669.5000	G-US-1
6804.0000	N-URS	6942.5000	BC-WW-1	7350.0000	N-US-4	7490.0000	N-NZL	7675.0000	G-CAN-4
6804.5000	N-URS	6942.8000	M-WW-2	7350.0000	PR-WW-2	7490.0000	BC-WW-1	7676.0000	SP-US-1
6805.0000	N-URS	6943.5000	CG-US-6	7351.5000	CG-US-4	7495.0000	N-US-4	7678.0000	G-US-3
6806.0000	PR-US-4	6945.0000	CG-US-6	7354.0000	PR-US-6	7500.0000	G-WW-3	7680.0000	AF-US-8
6808.0000	BC-WW-1	6945.0000	PS-AUS	7355.5000	G-US-2	7500.0000	N-US-4	7685.0000	N-US-4
6809.0000	G-US-1	6948.5000	CC-US-2	7357.0000	AF-US-8	7507.0000	N-US-1	7690.0000	G-US-3
6810.0000	G-US-10	6950.0000	PS-AUS	7360.0000	AF-US-8	7508.5000	G-US-10	7690.5000	G-US-2
6810.0000	SP-US-1	6950.0000	PR-US-6	7360.0000	N-US-4	7508.5000	CC-CAN	7691.0000	BC-WW-1
6810.0000	BC-WW-1	6952.5000	G-US-12	7360.0000	AR-US-1	7512.5000	CG-US-6	7697.0000	SP-US-1
6812.0000	AF-US-9	6955.0000	G-CAN-3	7360.0000	AR-US-3	7517.0000	G-US-3	7697.0000	PR-US-4
6812.0000	CG-US-6	6960.0000	PS-AUS	7365.0000	N-US-3	7517.0000	PS-AUS	7700.0000	G-US-2
6820.0000	SP-US-1	6965.0000	PS-AUS	7365.0000	N-US-4	7520.0000	G-US-3	7700.0000	G-US-3
6823.0000	BC-WW-1	6966.0000	CG-US-1	7367.5000	N-US-4	7525.0000	SP-US-1	7705.0000	SP-US-1
6824.0000	G-US-3	6966.5000	CC-CAN	7368.5000	CC-US-2	7527.0000	AF-US-8	7710.0000	CG-CAN
6825.0000	AF/N-G	6968.5000	N-US-4	7370.0000	N-US-3	7528.1000	CG-US-7	7714.0000	G-US-3
6825.0000	AR-US-3	6970.0000	N-US-3	7370.0000	N-US-4	7530.0000	CG-US-3	7717.5000	CG-US-6
6825.0000	PS-AUS	6970.0000	N-US-4	7372.5000	N-US-4	7530.0000	BC-WW-1	7719.0000	G-US-3
6825.0000	CC-CAN	6970.0000	G-US-9	7373.0000	N-US-4	7532.0000	G-WW-3	7720.0000	AR-US-3
6825.0000	BC-WW-1	6970.0000	BC-WW-1	7373.5000	G-US-1	7535.0000	N-US-1	7723.5000	G-US-2
6826.0000	AF-US-1	6972.0000	G-US-3	7375.0000	N-US-4	7535.0000	N-US-4	7724.0000	G-US-3
6828.0000	G-US-3	6974.0000	G-US-3	7377.5000	CG-US-8	7538.0000	G-US-3	7724.0000	BC-WW-1
6830.0000	CC-CAN	6975.0000	PS-AUS	7380.0000	N-US-4	7540.0000	AF-US-8	7726.5000	G-US-1
6838.0000	BC-WW-1	6975.0000	BC-WW-1	7382.5000	N-US-4	7540.0000	N-US-3	7726.5000	G-US-3
6839.4000	G-US-3	6976.0000	G-US-6	7385.0000	N-US-4	7541.0000	A-WW-1	7727.0000	G-US-3
6840.0000	AF-US-1	6977.5000	G-US-9	7387.5000	N-US-4	7541.5000	BC-WW-1	7731.0000	PR-US-6
6840.0000	G-WW-3	6977.5000	PS-CRIB	7392.0000	PS-AUS	7545.0000	AF-US-8	7736.0000	G-US-1
6840.0000	PS-AUS	6978.0000	G-US-3	7392.2000	M-US-3	7546.0000	M-CAN	7737.0000	G-US-3
6840.0000	BC-WW-1	6980.0000	G-US-3	7393.0000	N-US-3	7547.5000	CC-CAN	7742.0000	G-CAN-4
6845.0000	PS-AUS	6980.0000	BC-WW-1	7394.5000	N-URS	7548.5000	BC-WW-1	7743.0000	G-US-1
6845.0000	PR-US-6	6982.0000	G-US-3	7395.5000	N-URS	7549.0000	PR-US-4	7750.0000	N-US-3
6847.5000	BC-WW-1	6982.5000	G-US-2	7398.0000	M-US-3	7550.0000	PS-AUS	7750.0000	N-BEL
6850.0000	N-AUS	6982.5000	SP-US-1	7400.0000	A-WW-3	7552.0000	PR-US-4	7765.0000	N-URS
6850.0000	G-US-10	6987.0000	G-US-3	7400.0000	M-CAN	7555.0000	G-US-3	7765.0000	SP-US-1
6855.0000	PR-US-4	6987.5000	BC-WW-1	7401.0000	G-WW-3	7555.0000	PR-US-4	7767.5000	G-US-2
6858.0000	PR-US-4	6988.0000	AR-US-1	7401.5000	CC-CAN	7555.5000	G-CAN-4	7768.5000	BC-WW-1
6860.0000	G-US-3	6988.0000	AR-US-3	7405.0000	AR-US-3	7555.5000	G-CAN-3	7770.0000	G-US-10
6861.0000	PR-US-4	6991.0000	G-US-3	7405.0000	G-US-10	7558.0000	PR-US-4	7771.0000	N-J
6863.0000	AF-US-1	6993.0000	N-URS	7407.0000	AF-US-8	7558.5000	G-CAN-3	7775.0000	PR-US-2
6866.0000	PS-AUS	6993.0000	BC-WW-1	7408.5000	BC-WW-1	7559.0000	PR-US-4	7775.0000	PS-WW-1
6866.5000	G-US-3	6994.0000	AF-US-8	7410.0000	PS-AUS	7562.0000	PR-US-4	7778.0000	G-US-3
6870.0000	AF-US-1	6994.0000	AR-US-1	7411.0000	PR-US-6	7565.0000	PS-AUS	7778.5000	G-US-12
6870.0000	G-US-10	6995.0000	AF-US-8	7412.0000	SP-US-1	7567.0000	AF-US-6	7779.0000	N-URS
6871.0000	G-US-3	6995.0000	BC-WW-1	7419.0000	G-US-1	7569.5000	N-URS	7780.0000	G-CAN-1
6873.0000	BC-WW-1	6995.5000	AR-US-3	7420.0000	N-F	7580.0000	CG-US-6	7780.0000	PR-US-6
6874.0000	G-US-10	6996.0000	AF-US-8	7428.0000	G-WW-3	7580.0000	PR-US-2	7790.0000	G-US-8
6874.5000	CC-CAN	6997.5000	AR-US-3	7429.5000	G-US-2	7582.0000	G-US-1	7791.0000	G-US-3
6878.5000	N-US-4	6998.5000	PS-WW-1	7430.0000	AF-US-3	7590.0000	AR-US-3	7799.0000	AF-US-8
6880.0000	SP-US-1	7047.0000	N-AFS	7434.0000	G-US-3	7595.0000	N-URS	7800.0000	G-US-3
6880.0000	PS-AUS	7160.0000	M-AUS	7435.0000	N-URS	7597.1000	PR-US-3	7800.0000	BC-WW-1
6885.0000	PR-US-4	7220.0000	PS-CRIB	7440.0000	BC-WW-1	7600.0000	G-WW-3	7802.0000	G-US-7
6886.0000	AF-US-1	7300.0000	PR-US-1	7441.0000	CG-US-6	7604.0000	G-US-8	7804.0000	SP-US-1
6888.0000	N-F	7300.0000	PR-US-6	7442.0000	G-US-3	7605.0000	G-US-3	7804.0000	CC-CAN
6888.0000	PR-US-4	7301.5000	N-US-4	7442.5000	BC-WW-1	7605.0000	SP-US-1	7805.0000	G-US-7
6888.5000	BC-WW-1	7302.0000	AF-US-8	7445.0000	G-US-3	7620.0000	G-US-3	7812.0000	G-US-3
6889.0000	SP-US-1	7305.0000	AF-US-8	7452.0000	G-US-3	7620.0000	BC-WW-1	7816.0000	G-US-3
6890.0000	AF-US-5	7306.5000	G-CAN-2	7453.5000	PS-CRIB	7622.5000	G-US-3	7818.5000	CC-CAN
6890.0000	PS-AUS	7307.0000	PS-AUS	7455.0000	N-US-5	7623.0000	N-G	7821.0000	G-US-1
6895.0000	AF-US-5	7309.5000	AR-US-3	7457.0000	AF-US-8	7627.0000	G-US-3	7821.0000	G-US-3
6895.0000	G-US-10	7310.0000	CC-CAN	7460.0000	AF-US-5	7628.0000	G-US-3	7822.0000	G-US-3
6900.0000	PR-US-6	7311.0000	AR-US-3	7461.0000	SP-US-1	7630.0000	G-CAN-4	7825.0000	G-US-3
6902.5000	BC-WW-1	7312.0000	AF-US-8	7461.5000	M-CAN	7632.0000	AF-US-8	7825.0000	G-CAN-4
6905.0000	AR-CAN	7313.0000	SP-US-1	7462.0000	G-US-3	7633.5000	AF-US-8	7828.0000	AF-F
6905.0000	G-WW-3	7313.5000	AF-US-8	7465.0000	G-CAN-3	7634.0000	G-US-3	7830.0000	G-US-3
6910.0000	AR-US-1	7313.5000	AR-US-3	7465.0000	PS-AUS	7635.0000	AF-US-7	7831.5000	AF-US-8
6910.0000	AR-US-3	7315.0000	AF-US-8	7465.5000	G-US-2	7640.0000	G-US-3	7832.0000	G-WW-3
6910.0000	BC-WW-1	7321.5000	G-US-3	7465.5000	A-WW-5	7645.0000	N-US-1	7833.0000	SP-US-1
6918.5000	BC-US-1	7324.0000	AF-US-8	7470.0000	G-US-3	7645.0000	G-US-3	7835.0000	AR-US-1

7836.0000	CG-US-6	8063.0000	CG-US-6	8232.2000	M-WW-1	8364.0000	G-US-9	8607.0000	M-WW-2
7836.6000	CG-US-6	8063.6000	CG-US-6	8233.5000	N-US-1	8364.4000	CG-US-1	8610.0000	M-US-3
7839.0000	N-US-1	8067.0000	CC-US-2	8235.3000	M-WW-1	8379.5000	CG-US-1	8615.5000	AR-US-1
7840.0000	AF-US-9	8070.0000	PR-WW-2	8236.4000	M-CAN	8380.0000	PR-US-6	8615.5000	M-US-3
7840.5000	G-US-2	8070.0000	CC-US-2	8236.4000	M-ATN	8396.5000	CG-US-1	8618.0000	M-US-3
7846.0000	BC-WW-1	8077.0000	SP-US-1	8238.4000	M-WW-1	8410.4000	CG-US-1	8618.0000	M-WW-2
7849.5000	AR-US-3	8078.5000	N-URS	8241.5000	CG-US-8	8421.0000	M-WW-2	8622.0000	M-WW-2
7853.0000	AF-US-5	8084.0000	AF/N-G	8241.5000	M-WW-1	8427.0000	G-US-9	8623.0000	N-NZL
7860.0000	SP-US-1	8084.0000	G-US-10	8244.6000	M-WW-1	8427.5000	G-US-9	8624.0000	AR-US-1
7861.0000	AR-US-1	8090.0000	N-US-3	8245.0000	CG-US-8	8440.0000	CG-CAN	8625.0000	N-F
7862.5000	AF-US-8	8090.0000	CG-US-3	8247.7000	N-US-5	8441.0000	CG-US-3	8630.0000	M-US-3
7862.5000	PR-WW-2	8092.0000	CC-CAN	8247.7000	M-WW-1	8443.0000	CG-CAN	8632.0000	M-WW-2
7865.0000	G-US-3	8097.0000	G-US-3	8250.8000	M-WW-1	8444.5000	M-US-3	8634.0000	G-WW-3
7870.0000	AF-US-6	8101.0000	AF-US-1	8253.9000	M-WW-1	8445.0000	M-US-3	8636.0000	CG-US-3
7875.0000	G-US-3	8102.0000	N-URS	8257.0000	M-WW-1	8450.0000	PR-US-6	8638.5000	G-WW-3
7875.0000	G-US-5	8105.5000	G-US-3	8260.1000	M-WW-1	8450.0000	BC-WW-1	8640.0000	G-US-3
7878.0000	G-US-5	8110.0000	N-AUS	8263.2000	M-WW-1	8451.0000	CG-US-3	8642.0000	M-US-3
7880.0000	G-US-9	8110.0000	BC-WW-1	8264.0000	N-AFS	8452.0000	M-WW-2	8645.5000	N-URS
7882.0000	G-US-3	8111.0000	CG-US-6	8266.3000	M-WW-1	8453.0000	CG-CAN	8646.0000	N-URS
7885.0000	N-US-1	8115.0000	G-US-3	8269.4000	M-WW-1	8453.6000	CG-US-7	8646.0000	G-US-9
7887.5000	G-US-3	8115.0000	G-US-5	8272.5000	M-WW-1	8457.0000	CG-US-3	8646.0000	M-WW-2
7893.0000	N-US-1	8119.0000	G-US-10	8275.6000	M-WW-1	8457.1000	CG-US-7	8646.5000	N-URS
7893.0000	BC-WW-1	8120.0000	G-US-3	8278.7000	G-US-9	8459.0000	CG-US-4	8647.0000	N-URS
7894.0000	G-US-3	8120.0000	G-US-10	8278.7000	M-WW-1	8461.0000	CG-US-4	8647.5000	N-URS
7903.5000	G-US-12	8122.0000	G-US-10	8281.8000	M-WW-1	8461.0000	G-WW-3	8648.0000	N-URS
7905.5000	N-URS	8123.0000	G-US-3	8282.6000	G-US-9	8465.0000	CG-US-1	8648.0000	CG-US-2
7906.0000	G-WW-3	8125.0000	G-US-10	8284.4000	CG-CAN	8465.0000	CG-US-4	8648.5000	N-URS
7910.0000	SP-US-1	8125.0000	BC-WW-1	8284.9000	M-WW-1	8465.0000	M-WW-2	8649.0000	N-URS
7911.0000	G-US-3	8127.0000	G-US-3	8288.0000	M-WW-1	8471.0000	CG-US-1	8650.0000	CG-US-1
7913.5000	AF-US-8	8129.0000	G-US-3	8291.0000	PR-US-6	8473.0000	G-WW-3	8650.0000	G-WW-3
7918.0000	BC-WW-1	8130.0000	G-US-3	8291.1000	M-WW-1	8473.0000	M-WW-2	8650.0000	M-WW-2
7918.5000	AF-US-7	8130.0000	G-US-10	8294.2000	N-US-3	8475.6000	N-F	8654.4000	M-US-3
7918.5000	CG-US-6	8135.0000	G-US-3	8294.2000	M-WW-1	8476.0000	M-WW-2	8654.4000	M-WW-2
7919.0000	SP-US-1	8135.0000	G-CAN-4	8294.5000	N-AUS	8478.0000	M-WW-2	8658.0000	M-US-3
7922.0000	N-AUS	8136.5000	N-URS	8295.0000	CG-US-8	8486.0000	M-US-3	8660.0000	BC-WW-1
7922.5000	AF-US-6	8144.0000	PS-AUS	8295.6000	G-US-11	8488.0000	CG-US-7	8662.0000	AF-CAN
7924.0000	N-AUS	8144.5000	N-URS	8296.0000	PR-US-6	8489.0000	CG-US-7	8666.0000	M-US-3
7925.0000	BC-WW-1	8147.0000	PS-AUS	8297.1000	CG-US-8	8490.0000	CG-US-3	8669.9000	M-I
7929.5000	N-US-3	8150.0000	N-G	8297.6000	CG-US-3	8490.0000	BC-WW-1	8670.5000	N-URS
7932.0000	AR-US-1	8150.0000	N-US-4	8298.0000	PR-US-6	8492.0000	M-J	8674.0000	M-WW-2
7932.0000	G-US-7	8150.0000	CG-US-7	8298.1000	CG-US-4	8498.0000	M-WW-2	8675.4000	M-WW-2
7933.0000	G-US-3	8150.0000	PS-AUS	8298.1000	CG-US-3	8500.0000	AR-US-1	8678.0000	M-WW-2
7935.0000	G-US-5	8151.5000	G-CAN-4	6498.5000	G-CAN-4	8500.1000	CG-US-3	8680.1000	CG-US-7
7935.0000	G-US-7	8154.0000	G-US-3	8298.1000	M-US-3	8501.0000	CG-US-7	8680.6000	CG-US-7
7937.0000	G-US-3	8158.5000	N-URS	8298.6000	CG-US-3	8502.0000	CG-US-3	8682.0000	CG-US-4
7938.0000	AF-US-8	8160.0000	G-US-3	8299.1000	CG-US-4	8502.0000	CG-US-7	8682.0000	CG-US-3
7952.0000	M-US-5	8161.0000	N-J	8299.1000	CG-US-3	8504.0000	M-WW-2	8682.0000	CG-US-7
7953.0000	CC-CAN	8167.5000	G-WW-3	8302.0000	G-US-3	8508.0000	M-US-3	8682.0000	M-WW-2
7953.5000	N-URS	8170.0000	A-US-1	8329.6000	CG-US-5	8510.0000	N-NOR	8686.0000	M-US-3
7955.0000	BC-WW-1	8172.0000	G-US-3	8330.2000	CG-US-5	8510.0000	CG-US-1	8690.0000	M-WW-2
7956.0000	G-US-10	8174.0000	G-US-3	8330.5000	CC-CAN	8510.0000	CG-US-4	8697.0000	CG-CAN
7960.0000	G-US-3	8176.0000	G-US-3	8330.8000	CG-US-5	8514.0000	M-US-3	8706.5000	CG-US-4
7965.0000	N-URS	8177.0000	AF-US-8	8334.0000	G-US-3	8518.1000	N-ISR	8706.5000	CG-US-3
7971.0000	PR-WW-2	8178.5000	AF-US-8	8334.0000	PR-US-6	8525.0000	M-US-3	8708.5000	CG-US-7
7972.0000	G-US-3	8180.0000	AR-US-1	8340.0000	PS-AUS	8527.5000	M-WW-2	8710.5000	CG-US-1
7973.0000	BC-WW-1	8185.0000	G-US-3	8340.5000	G-CAN-4	8530.0000	M-I	8710.5000	CG-US-4
7977.0000	BC-WW-1	8185.0000	PS-AUS	8343.5000	CG-US-8	8536.0000	CG-US-3	8710.5000	CG-US-3
7980.5000	M-US-3	8186.0000	N-J	8345.0000	BC-WW-1	8539.0000	G-WW-3	8711.0000	M-US-3
7983.0000	AF-US-1	8194.5000	G-US-3	8345.5000	CG-US-4	8542.0000	AF-CAN	8712.5000	CG-US-7
7983.0000	G-US-3	8195.0000	CG-US-8	8345.5000	CG-US-3	8542.0000	G-WW-3	8713.0000	M-US-3
7991.0000	BC-WW-1	8195.0000	M-WW-1	8349.5000	CG-US-1	8554.0000	CG-US-3	8714.0000	G-US-9
7992.5000	N-US-4	8195.0000	PR-US-6	8349.5000	CG-US-4	8558.0000	G-WW-3	8714.5000	CG-US-1
7993.0000	N-US-3	8198.1000	M-WW-1	8349.5000	CG-US-3	8558.4000	M-US-3	8714.5000	CG-US-4
8003.5000	BC-WW-1	8201.0000	PR-US-6	8350.0000	M-US-3	8562.0000	M-WW-2	8714.5000	CG-US-3
8008.0000	G-US-3	8201.2000	M-US-4	8352.0000	M-US-3	8565.0000	AR-US-1	8715.0000	M-US-3
8013.5000	G-US-2	8201.2000	M-WW-1	8353.0000	G-US-9	8566.0000	M-WW-2	8716.0000	CG-US-7
8015.0000	PR-US-6	8204.3000	M-WW-1	8353.5000	CG-US-1	8570.0000	CG-US-4	8716.5000	CG-CAN
8021.5000	CG-US-6	8207.4000	M-WW-1	8353.5000	CG-US-4	8570.0000	M-US-3	8716.5000	G-CAN-4
8025.0000	G-US-5	8210.5000	M-WW-1	8353.5000	CG-US-3	8570.0000	M-WW-2	8717.0000	G-CAN-4
8030.0000	G-WW-3	8210.8000	M-US-3	8354.0000	M-US-3	8574.0000	CG-US-1	8718.0000	CG-US-1
8033.0000	N-US-4	8213.6000	M-US-4	8355.0000	CG-US-8	8574.0000	CG-US-4	8718.0000	CG-US-4
8035.0000	G-US-3	8213.6000	M-WW-1	8355.5000	G-CAN-4	8574.0000	M-WW-2	8718.0000	CG-US-3
8035.0000	PS-AUS	8216.7000	M-WW-1	8356.0000	G-CAN-4	8582.0000	CG-US-1	8718.9000	CG-US-8
8038.0000	G-WW-3	8217.0000	G-US-3	8357.0000	CG-US-1	8582.0000	CG-US-4	8718.9000	M-WW-1
8040.0000	AR-US-1	8219.8000	M-WW-1	8357.0000	CG-US-4	8585.0000	M-WW-2	8721.0000	G-WW-3
8045.0000	G-US-10	8222.9000	M-WW-1	8357.0000	CG-US-3	8586.0000	M-US-3	8722.0000	M-WW-1
8045.0000	G-WW-3	8226.0000	M-WW-1	8363.6000	CG-US-1	8597.0000	M-WW-2	8725.1000	M-US-4
8046.5000	G-CAN-3	8229.1000	G-US-9	8364.0000	N-J	8598.4000	N-NZL	8725.1000	M-WW-1
8060.0000	AR-US-1	8229.1000	M-WW-1	8364.0000	CG-US-1	8603.5000	AR-US-1	8726.0000	M-WW-2

8728.2000	M-WW-1	8891.0000	A-WW-2	9032.0000	N-US-1	9215.0000	N-US-3	9842.0000	G-US-3
8731.0000	AF-US-5	8894.0000	A-WW-2	9037.0000	N-US-1	9215.0000	N-URS	9843.0000	N-AFS
8731.3000	M-WW-1	8895.0000	A-WW-1	9040.0000	G-US-3	9220.0000	AF-US-1	9846.0000	G-US-10
8734.4000	M-WW-1	8897.0000	A-WW-2	9040.0000	PR-US-1	9223.0000	CG-US-6	9858.0000	BC-WW-1
8737.5000	CG-CAN	8903.0000	A-WW-2	9040.0000	PR-US-6	9223.6000	CG-US-6	9862.5000	G-US-3
8737.5000	M-US-4	8907.0000	AF-AUS/NZL	9040.5000	G-US-3	9224.0000	AF-US-8	9881.0000	G-US-3
8737.5000	M-WW-1	8917.0000	G-US-3	9040.6000	PR-WW-2	9224.0000	G-US-3	9905.0000	BC-WW-1
8740.6000	M-WW-1	8917.0000	A-WW-2	9043.0000	AF/N-G	9229.0000	G-US-3	9910.0000	G-US-3
8743.7000	M-WW-1	8918.0000	A-WW-2	9043.0000	SP-US-1	9234.0000	AF-US-1	9910.0000	SP-US-1
8746.8000	M-WW-1	8921.0000	A-US-1	9043.5000	N-URS	9236.0000	AF-US-6	9918.0000	G-US-2
8749.9000	M-WW-1	8921.0000	A-WW-1	9046.0000	G-US-3	9238.5000	G-US-12	9920.0000	G-US-3
8753.0000	CG-CAN	8924.0000	A-US-1	9047.0000	AF-US-8	9240.0000	PR-US-6	9930.0000	G-US-1
8753.0000	G-US-4	8924.0000	A-WW-1	9047.5000	G-US-3	9240.0000	BC-WW-1	9940.0000	N-AUS
8753.0000	G-US-9	8924.0000	A-WW-2	9050.0000	CG-US-7	9249.2000	M-US-3	9941.5000	N-AUS
8753.0000	M-WW-1	8927.0000	A-US-1	9051.0000	G-US-3	9250.0000	BC-WW-1	9941.5000	PR-US-1
8754.0000	G-US-9	8927.0000	A-WW-1	9052.0000	G-US-3	9257.0000	N-US-1	9942.0000	G-US-3
8756.1000	M-WW-1	8930.0000	A-US-1	9052.0000	N-US-4	9260.0000	N-US-1	9946.0000	G-US-6
8757.0000	N-US-1	8930.0000	A-WW-1	9055.0000	G-US-3	9265.0000	G-CAN-4	9947.5000	G-US-9
8759.2000	CG-CAN	8932.0000	G-US-3	9057.0000	AF-US-1	9268.0000	N-F	9950.0000	G-US-10
8759.2000	M-WW-1	8933.0000	A-US-1	9057.5000	N-URS	9268.0000	G-US-3	9955.0000	G-US-3
8762.3000	M-WW-1	8933.0000	A-WW-1	9062.0000	G-US-3	9272.0000	N-BEL	9966.0000	G-US-3
8765.4000	CG-US-7	8936.0000	A-US-1	9065.0000	G-US-3	9278.0000	G-US-3	9973.0000	G-US-3
8765.4000	CG-US-8	8936.0000	A-WW-1	9073.0000	N-US-3	9278.5000	CG-US-8	9977.0000	CG-US-6
8765.4000	M-WW-1	8938.0000	N-AUS	9073.0000	CG-US-6	9280.0000	N-URS	9982.0000	G-US-3
8765.4000	M-WW-2	8938.0000	A-WW-5	9074.5000	G-US-1	9285.0000	G-WW-3	9982.5000	G-US-10
8768.5000	CG-US-8	8939.0000	A-WW-5	9078.0000	G-US-3	9290.0000	BC-WW-1	9985.0000	G-US-3
8768.5000	M-WW-1	8942.0000	A-WW-2	9079.0000	G-US-3	9297.0000	CG-US-6	9989.0000	BC-WW-1
8770.4000	M-CAN	8951.0000	A-WW-2	9081.5000	CC-CAN	9297.0000	G-US-3	9990.0000	AR-US-3
8770.4000	M-ATN	8952.0000	A-WW-1	9086.0000	G-US-3	9303.0000	CG-US-6	9996.0000	G-WW-3
8771.6000	N-US-5	8952.0000	A-WW-5	9090.0000	BC-WW-1	9305.0000	AR-US-3	9997.0000	G-US-3
8771.6000	M-WW-1	8957.0000	A-WW-5	9092.0000	PS-S	9311.5000	G-US-12	10000.0000	G-WW-3
8774.7000	M-WW-1	8960.0000	N-F	9100.0000	N-G	9312.0000	N-URS	10004.0000	G-WW-3
8777.8000	M-WW-1	8964.0000	AF-US-2	9100.0000	G-US-3	9314.5000	N-URS	10015.0000	G-US-9
8778.0000	N-US-1	8964.0000	AF-US-3	9100.0000	BC-WW-1	9315.0000	CC-CAN	10017.0000	A-WW-2
8778.6000	M-I	8967.0000	AF-US-3	9104.0000	G-US-3	9320.0000	BC-WW-1	10017.0000	A-WW-5
8780.9000	M-WW-1	8967.0000	AF/N-G	9105.0000	G-WW-3	9325.0000	N-URS	10018.0000	A-WW-2
8780.9000	M-WW-2	8967.0000	AF-SAU	9105.0000	G-CAN-1	9350.0000	BC-WW-1	10024.0000	G-US-3
8783.2000	M-US-3	8971.0000	AF-AUS/NZL	9106.0000	N-G	9359.5000	G-US-2	10024.0000	A-WW-2
8784.0000	M-WW-1	8972.0000	N-US-1	9108.0000	CG-US-8	9370.5000	N-URS	10027.0000	A-US-1
8787.1000	CG-CAN	8974.0000	N-US-3	9110.0000	CG-US-3	9380.0000	N-US-1	10027.0000	A-WW-1
8787.1000	M-WW-1	8974.5000	N-URS	9112.0000	G-US-3	9389.5000	G-CAN-3	10030.0000	A-US-1
8789.7000	G-US-9	8975.0000	AF/N-G	9114.0000	G-CAN-3	9391.0000	G-CAN-3	10030.0000	A-WW-1
8790.2000	M-WW-1	8975.0000	AF-AUS/NZL	9115.0000	SP-US-1	9392.5000	G-CAN-3	10033.0000	A-US-1
8793.2000	M-US-3	8975.0000	AF-AFS	9115.0000	BC-WW-1	9396.0000	CG-US-6	10039.0000	A-WW-2
8793.3000	CG-CAN	8976.0000	N-US-1	9115.5000	G-US-2	9410.0000	G-US-3	10040.0000	CG-US-3
8793.3000	M-WW-1	8980.0000	AF-AUS/NZL	9115.5000	G-CAN-3	9410.0000	G-US-10	10040.0000	G-US-3
8796.4000	M-US-3	8981.5000	N-US-1	9121.8000	G-US-1	9419.0000	AR-US-3	10042.0000	G-US-3
8796.4000	M-WW-1	8984.0000	AF-AUS/NZL	9122.5000	AR-US-1	9435.0000	N-NZL	10042.0000	A-WW-2
8796.4000	M-WW-2	8984.0000	CG-US-2	9125.0000	CG-US-8	9435.0000	G-US-6	10045.0000	CG-US-3
8796.4000	M-I	8989.0000	AF-US-3	9125.0000	G-US-3	9440.0000	G-US-3	10045.0000	G-US-3
8799.5000	M-WW-1	8990.0000	AF/N-G	9127.0000	CG-US-4	9445.0000	G-US-3	10045.0000	A-US-2
8800.6000	G-US-9	8990.0000	AF-SAU	9130.0000	AR-US-2	9445.0000	CC-CAN	10045.0000	PR-US-6
8802.6000	G-US-9	8990.0000	CG-US-2	9130.0000	CG-US-3	9462.0000	G-US-1	10048.0000	A-WW-2
8802.6000	M-WW-1	8992.0000	AF-AUS/NZL	9130.0000	G-US-3	9462.0000	CC-CAN	10048.0000	A-WW-5
8805.7000	M-WW-1	8992.0000	AF-AFS	9132.0000	SP-US-1	9473.5000	CG-US-6	10051.0000	A-WW-5
8805.7000	M-WW-2	8993.0000	AF-US-3	9138.0000	SP-US-1	9474.0000	CG-US-6	10057.0000	A-WW-5
8808.8000	M-WW-1	8993.0000	SP-US-1	9140.0000	G-US-3	9481.0000	G-US-3	10066.0000	A-WW-2
8811.9000	M-WW-1	8997.0000	N-US-3	9140.0000	BC-WW-1	9497.0000	PR-US-6	10067.0000	A-WW-5
8815.0000	G-US-3	9002.0000	N-US-1	9145.0000	G-US-3	9500.0000	PR-US-6	10069.0000	A-US-1
8819.0000	A-WW-1	9003.0000	A-WW-1	9145.0000	BC-WW-1	9630.0000	CG-US-6	10069.0000	A-WW-1
8819.0000	A-WW-5	9005.0000	AF-AUS/NZL	9148.5000	CC-CAN	9650.0000	AR-US-1	10072.0000	A-US-1
8822.0000	A-US-2			9150.0000	BC-WW-1	9657.0000	PR-US-6	10072.0000	A-WW-1
8822.0000	PR-US-6	9006.0000	AF-CAN	9162.0000	G-US-3	9657.0000	CC-US-1	10075.0000	A-US-1
8825.0000	A-WW-2	9006.0000	N-US-1	9169.0000	G-US-1	9775.0000	PR-US-1	10075.0000	A-WW-1
8828.0000	A-WW-5	9010.0000	AF-CAN	9170.0000	SP-US-1	9784.0000	G-US-3	10078.0000	CG-US-3
8842.0000	A-URS	9011.0000	AF-US-3	9170.0000	BC-WW-1	9785.0000	N-US-3	10078.0000	A-US-1
8843.0000	A-WW-2	9014.0000	AF-US-2	9172.0000	G-CAN-2	9785.0000	G-US-10	10078.0000	A-WW-1
8846.0000	A-WW-2	9014.0000	AF-US-3	9172.5000	AF-US-6	9786.5000	N-US-3	10084.0000	A-WW-2
8852.0000	A-WW-5	9015.0000	G-US-12	9181.0000	AR-US-3	9788.0000	N-F	10087.0000	A-WW-5
8861.0000	A-WW-2	9018.0000	AF-US-3	9183.5000	G-US-12	9793.0000	AF-US-4	10090.0000	A-WW-5
8861.0000	A-WW-5	9018.0000	AF-CUB	9185.0000	G-US-1	9796.5000	G-US-10	10096.0000	G-US-3
8864.0000	A-WW-2	9018.0000	SP-US-1	9197.0000	G-US-1	9802.0000	PR-US-6	10096.0000	A-WW-2
8867.0000	A-WW-2	9022.0000	SP-US-1	9198.0000	AF-US-6	9810.0000	AR-US-3	10100.0000	N-URS
8870.0000	A-WW-1	9023.0000	AF-US-1	9200.0000	G-WW-3	9811.0000	G-US-3	10100.0000	G-US-3
8873.0000	A-WW-1	9023.0000	AF-US-4	9200.0000	G-CAN-1	9813.0000	G-CAN-2	10100.0000	PS-CRIB
8876.0000	G-US-9	9025.0000	AF/N-G	9200.0000	BC-WW-1	9821.0000	G-WW-3	10100.0000	PR-US-1
8879.0000	A-WW-2	9027.0000	AF-US-1	9210.0000	BC-WW-1	9827.0000	G-US-3	10100.0000	PR-US-6
8888.0000	A-WW-1	9029.0000	SP-US-1	9210.0000	N-US-4	9830.0000	N-US-3	10101.0000	G-US-3
8888.0000	A-WW-5	9032.0000	AF/N-G	9212.0000	SP-US-1	9840.0000	G-US-3	10110.0000	G-US-3

10113.0000	N-F	10390.0000	G-US-3	10655.0000	G-US-8	11046.0000	G-US-3	11252.0000	N-US-1
10118.8000	AF-US-6	10390.0000	G-WW-3	10660.0000	SP-US-1	11055.0000	G-CAN-4	11252.0000	SP-US-1
10120.0000	PR-US-6	10390.0000	G-CAN-1	10660.0000	BC-WW-1	11070.0000	G-US-3	11255.0000	N-US-1
10120.0000	BC-WW-1	10393.0000	G-US-3	10675.0000	CG-US-3	11070.0000	BC-WW-1	11255.0000	N-US-3
10125.0000	BC-WW-1	10398.0000	G-US-3	10675.0000	G-US-3	11073.5000	PR-US-6	11255.0000	N-G
10130.0000	N-US-5	10400.0000	PR-US-6	10675.0000	BC-WW-1	11075.0000	G-US-12	11255.0000	G-US-3
10136.0000	CG-US-8	10400.0000	CC-US-1	10680.0000	G-US-3	11076.0000	PR-US-6	11256.0000	A-WW-1
10138.0000	CG-US-3	10402.0000	G-US-3	10688.0000	N-NZL	11077.5000	G-CAN-4	11257.0000	AF/N-G
10140.0000	AF-US-8	10402.0000	BC-WW-1	10689.0000	BC-WW-1	11086.0000	G-US-3	11261.0000	N-US-1
10140.0000	N-URS	10405.0000	PR-WW-2	10690.0000	BC-WW-1	11090.0000	G-US-3	11266.0000	AF-US-3
10145.0000	G-US-3	10415.0000	G-US-3	10705.0000	G-US-3	11090.0000	G-US-10	11266.0000	AF-D
10146.0000	G-US-3	10415.0000	BC-WW-1	10707.0000	G-US-3	11090.0000	BC-WW-1	11267.0000	N-US-1
10150.0000	G-US-3	10418.0000	BC-WW-1	10707.0000	PR-US-6	11092.0000	BC-WW-1	11271.0000	AF-F
10157.0000	CG-CAN	10423.0000	G-US-3	10710.0000	BC-WW-1	11095.0000	G-US-3	11279.0000	A-WW-2
10159.0000	SP-US-1	10430.0000	G-US-3	10714.0000	G-US-3	11095.0000	BC-WW-1	11279.0000	A-WW-5
10163.0000	G-US-10	10434.0000	G-US-3	10720.0000	G-US-3	11098.5000	AF-US-8	11282.0000	A-WW-2
10164.0000	G-US-3	10436.0000	G-US-10	10725.0000	G-US-3	11100.0000	AF-US-1	11287.0000	CC-US-1
10165.0000	AR-US-3	10437.5000	G-US-10	10730.0000	N-US-1	11104.0000	N-US-3	11288.0000	A-US-2
10166.0000	CG-US-8	10452.0000	AF-US-1	10730.0000	G-US-3	11104.0000	SP-US-1	11288.0000	PR-US-6
10168.0000	CG-US-4	10452.0000	AF-US-3	10732.0000	G-US-3	11105.0000	G-US-3	11291.0000	A-WW-2
10183.0000	G-US-3	10454.0000	BC-WW-1	10737.0000	G-US-3	11106.0000	G-US-3	11297.0000	A-WW-5
10185.0000	AF-US-6	10456.5000	BC-WW-1	10740.0000	BC-WW-1	11118.0000	AF-US-1	11300.0000	N-F
10190.0000	PR-US-1	10464.0000	G-US-3	10748.0000	G-US-3	11121.0000	AF-US-8	11300.0000	A-WW-2
10190.0000	BC-WW-1	10475.0000	G-US-3	10755.0000	G-US-3	11121.5000	G-US-10	11305.0000	G-US-3
10194.0000	G-US-1	10475.0000	SP-US-1	10760.0000	N-NZL	11122.0000	G-US-3	11306.0000	A-US-2
10195.0000	G-US-1	10476.0000	BC-WW-1	10760.0000	G-US-3	11123.0000	G-US-3	11306.0000	PR-US-6
10200.0000	PR-US-6	10480.0000	G-US-3	10760.0000	BC-WW-1	11125.0000	G-US-3	11312.0000	A-URS
10200.0000	CC-US-1	10482.0000	G-US-3	10770.0000	G-US-3	11126.5000	G-US-2	11315.0000	A-WW-5
10205.0000	AF-US-6	10484.0000	G-US-3	10775.0000	G-W-3	11142.0000	G-US-3	11318.0000	A-WW-5
10205.4000	AF-US-6	10493.0000	G-US-1	10780.0000	G-US-3	11145.0000	N-AFS	11319.0000	A-WW-2
10208.0000	AF-US-6	10507.0000	CG-US-3	10780.0000	SP-US-1	11145.0000	G-US-3	11330.0000	A-WW-2
10210.0000	G-US-3	10510.0000	AF-US-1	10790.0000	G-US-3	11148.0000	G-US-3	11339.0000	A-WW-1
10211.3000	AF-US-6	10510.0000	AF-US-3	10792.0000	G-US-3	11152.0000	G-US-3	11342.0000	A-US-1
10215.0000	SP-US-1	10510.0000	SP-US-1	10800.0000	PR-US-6	11152.5000	BC-WW-1	11345.0000	A-US-1
10216.5000	N-NRS	10520.0000	G-US-3	10800.0000	CC-US-1	11155.5000	N-URS	11345.0000	A-WW-1
10225.0000	G-US-1	10520.0000	CC-CAN	10804.0000	G-US-3	11166.0000	G-US-3	11348.0000	A-US-1
10230.0000	G-US-3	10520.0000	BC-WW-1	10804.0000	SP-US-1	11170.0000	G-US-3	11348.0000	A-URS
10230.0000	SP-US-1	10522.0000	G-US-3	10815.0000	AR-US-3	11175.0000	BC-WW-1	11351.0000	A-US-1
10235.0000	N-US-3	10523.6000	CG-US-6	10832.0000	G-US-3	11176.0000	AF-US-3	11351.0000	A-WW-1
10235.0000	BC-WW-1	10530.0000	BC-WW-1	10850.0000	SP-US-1	11179.0000	AF-US-3	11354.0000	A-US-1
10237.5000	BC-WW-1	10531.5000	AF-US-6	10853.0000	G-US-3	11181.0000	G-US-3	11354.0000	A-WW-1
10248.0000	G-US-3	10536.0000	AF-CAN	10855.0000	BC-WW-1	11182.0000	AF-US-3	11360.0000	A-WW-2
10255.0000	G-US-3	10538.0000	G-US-3	10860.0000	BC-WW-1	11185.0000	AF/N-G	11362.0000	G-US-3
10255.0000	N-US-4	10538.0000	BC-WW-1	10865.0000	BC-WW-1	11187.0000	AF-D	11369.0000	A-WW-5
10259.5000	N-US-4	10547.0000	G-US-3	10866.5000	BC-WW-1	11190.0000	N-US-1	11375.0000	A-WW-2
10265.0000	PR-US-2	10550.0000	N-NZL	10869.0000	BC-WW-1	11191.0000	N-US-1	11384.0000	A-WW-2
10267.0000	AF-US-8	10550.0000	G-US-3	10870.7000	G-US-1	11193.0000	A-URS	11387.0000	A-WW-5
10270.0000	AF-US-8	10550.0000	G-US-12	10871.5000	G-US-2	11195.0000	N-US-1	11391.0000	A-WW-5
10270.0000	SP-US-1	10554.0000	G-US-3	10872.0000	BC-WW-1	11195.0000	PR-US-6	11396.0000	A-WW-2
10272.0000	SP-US-1	10555.0000	N-URS	10877.5000	BC-WW-1	11197.0000	A-WW-1	11397.5000	G-US-2
10273.5000	AF-US-8	10555.5000	G-US-2	10880.0000	SP-US-1	11198.0000	N-US-1	11398.0000	G-US-9
10285.0000	G-US-3	10560.0000	G-US-3	10880.0000	BC-WW-1	11198.0000	CG-US-2	11400.0000	G-US-3
10290.0000	G-CAN-4	10563.0000	G-US-10	10891.0000	G-US-1	11200.0000	AF/N-G	11400.0000	PR-US-1
10295.0000	G-WW-3	10567.0000	G-US-3	10900.0000	G-US-3	11201.0000	AF-AUS/NZL	11401.0000	A-WW-1
10298.0000	G-US-3	10570.5000	N-URS	10902.0000	G-US-8	11201.0000	CG-US-2	11401.0000	N-US-4
10301.0000	SP-US-1	10576.0000	AF-US-8	10905.0000	SP-US-1	11204.0000	AF/N-G	11402.5000	N-US-4
10305.0000	AF-US-6	10586.0000	AR-US-1	10915.0000	G-US-12	11210.0000	G-US-12	11406.0000	G-US-3
10305.0000	SP-US-1	10588.0000	G-US-1	10918.0000	G-US-1	11212.0000	AF/N-G	11407.0000	AF-US-8
10310.0000	G-US-3	10595.0000	BC-WW-1	10922.0000	BC-WW-1	11214.0000	AF-US-2	11407.0000	SP-US-1
10310.0000	SP-US-1	10600.0000	PR-US-6	10922.5000	G-US-3	11214.0000	AF-AUS/NZL	11408.0000	AF-US-1
10310.0000	PR-US-2	10600.0000	CC-US-1	10935.0000	AF-US-3	11216.0000	G-US-1	11410.0000	N-US-1
10315.0000	AF-US-6	10602.0000	G-US-3	10935.0000	BC-WW-1	11220.0000	AF-US-1	11411.0000	G-US-3
10315.0000	BC-WW-1	10607.0000	G-US-3	10938.5000	CG-US-6	11220.0000	G-US-3	11414.0000	SP-US-1
10318.0000	G-US-3	10618.5000	G-US-3	10942.0000	G-US-3	11224.0000	AF/N-G	11418.0000	G-US-3
10320.0000	BC-WW-1	10620.0000	CG-US-3	10949.0000	SP-US-1	11228.0000	AF-US-3	11422.0000	G-US-3
10322.0000	G-US-3	10620.0000	BC-WW-1	10958.0000	G-US-3	11230.0000	CG-US-3	11423.0000	G-US-3
10325.0000	G-US-3	10621.0000	G-US-3	10958.5000	CG-US-6	11230.0000	G-US-3	11424.0000	G-US-3
10327.0000	SP-US-1	10627.0000	G-US-3	10972.0000	BC-WW-1	11233.0000	AF-CAN	11425.0000	AR-US-2
10333.6000	CG-US-6	10637.0000	G-US-3	10985.0000	G-US-10	11234.0000	AF/N-G	11433.0000	G-US-3
10335.4000	BC-WW-1	10640.0000	G-US-3	10990.0000	BC-WW-1	11234.0000	N-US-1	11434.0000	CG-US-8
10337.5000	CG-US-6	10642.5000	G-US-3	10997.5000	AR-US-3	11235.0000	AF-AUS/NZL	11434.0000	G-US-3
10338.0000	BC-WW-1	10643.5000	N-URS	11000.0000	N-SAM	11236.0000	AF-US-3	11436.0000	CG-US-4
10344.0000	AF-US-1	10644.0000	N-URS	11000.0000	G-US-3	11237.0000	AF-AFS	11436.0000	CG-US-3
10350.0000	N-URS	10644.5000	N-URS	11005.0000	G-US-3	11239.0000	AF-US-3	11437.0000	CC-US-2
10352.0000	SP-US-1	10645.5000	N-URS	11028.0000	CG-US-6	11243.0000	AF-US-1	11440.0000	AF-US-5
10365.0000	G-US-3	10646.0000	N-URS	11028.0000	G-US-1	11246.0000	AF-US-3	11440.0000	G-WW-3
10368.5000	CG-US-6	10646.5000	N-URS	11037.0000	G-US-3	11247.0000	AF-AUS/NZL	11441.0000	AF-US-4
10382.5000	BC-WW-1	10647.0000	N-URS	11042.0000	G-US-3	11249.0000	AF-CAN	11441.0000	G-US-3
10385.0000	BC-WW-1	10649.0000	N-BEL	11045.0000	G-US-1	11250.0000	G-US-3	11445.0000	BC-WW-1

11447.0000	G-US-3	11695.0000	G-CAN-4	12215.0000	N-AUS	12385.8000	G-US-9	12660.0000	PR-US-6
11448.0000	G-US-3	11700.0000	PR-US-6	12215.0000	G-US-3	12385.8000	M-WW-1	12664.5000	CG-US-4
11449.0000	G-US-3	11721.0000	G-US-1	12222.0000	PR-US-6	12388.9000	M-WW-1	12664.5000	CG-US-3
11455.0000	G-US-3	11763.0000	PR-US-6	12223.0000	BC-WW-1	12392.0000	M-WW-1	12665.0000	N-F
11459.0000	G-US-3	11763.0000	CC-US-1	12223.0000	N-US-4	12395.1000	M-WW-1	12671.0000	CG-CAN
11459.0000	BC-WW-1	11764.5000	AR-US-1	12225.0000	CG-US-3	12398.2000	M-WW-1	12695.5000	M-US-3
11460.0000	N-US-3	11801.0000	G-US-1	12225.0000	G-US-3	12401.3000	M-WW-1	12700.0000	CG-US-1
11460.0000	G-US-3	11957.0000	G-US-1	12230.0000	CG-US-3	12401.4000	G-US-9	12700.0000	M-WW-2
11461.0000	G-US-3	11975.0000	PR-US-1	12230.0000	G-US-3	12404.4000	M-WW-1	12711.0000	M-WW-2
11461.5000	N-US-3	11975.0000	PR-US-6	12233.5000	G-US-2	12407.5000	M-WW-1	12714.0000	CG-US-4
11462.0000	AR-G	11980.0000	G-US-3	12235.0000	CG-US-3	12410.6000	M-WW-1	12714.0000	M-WW-2
11462.0000	GK-US-3	11984.0000	SP-US-1	12235.0000	G-US-3	12413.7000	M-WW-1	12718.5000	CG-US-1
11463.0000	N-US-1	11985.0000	N-F	12238.5000	G-US-3	12416.8000	M-WW-1	12718.5000	M-WW-2
11463.0000	G-US-3	11985.0000	G-US-3	12240.0000	AR-US-1	12419.9000	M-WW-1	12724.0000	G-WW-3
11464.0000	G-US-3	11987.0000	G-US-3	12240.0000	G-US-10	12420.0000	G-US-3	12726.0000	CG-CAN
11470.0000	G-CAN-4	11988.0000	SP-US-1	12240.0000	BC-WW-1	12422.4000	G-US-9	12727.5000	M-WW-2
11470.0000	PR-WW-2	11990.0000	AR-US-3	12246.5000	BC-WW-1	12423.0000	CC-AUS	12728.6000	CG-US-7
11471.0000	G-US-10	11995.0000	G-US-3	12250.0000	BC-WW-1	12423.0000	M-WW-1	12730.0000	CG-US-7
11474.0000	G-US-3	12000.0000	AR-US-1	12253.0000	BC-WW-1	12424.5000	CG-CAN	12732.0000	CG-US-3
11475.0000	G-US-3	12008.0000	G-US-3	12254.0000	G-US-3	12425.9000	G-US-9	12740.0000	M-WW-2
11478.0000	G-US-3	12008.0000	G-WW-3	12255.0000	N-AUS	12426.1000	CG-US-8	12743.0000	CG-US-1
11488.5000	G-US-12	12009.0000	G-US-1	12255.0000	AR-US-1	12426.1000	M-WW-1	12743.0000	CG-US-4
11494.0000	AF-US-1	12020.5000	G-US-2	12256.5000	N-AUS	12429.0000	PR-US-6	12743.0000	M-WW-2
11495.0000	BC-WW-1	12022.5000	G-US-3	12256.5000	PR-US-1	12429.2000	N-US-3	12745.0000	G-WW-3
11500.0000	G-US-3	12029.0000	N-US-3	12257.0000	G-US-3	12429.2000	M-WW-1	12748.1000	CG-US-3
11505.0000	G-US-3	12030.0000	G-US-3	12260.0000	G-US-3	12432.0000	PR-US-6	12750.0000	CG-US-4
11505.0000	G-CAN-4	12049.0000	N-US-4	12265.0000	G-US-3	12432.3000	M-WW-1	12750.0000	CG-US-3
11508.0000	G-US-3	12060.0000	AR-US-1	12268.5000	G-US-3	12433.7000	G-US-11	12754.0000	CG-US-3
11510.0000	AR-US-1	12060.0000	G-US-3	12270.0000	AR-US-1	12435.4000	M-WW-1	12755.5000	M-WW-2
11510.0000	SP-US-1	12064.5000	G-US-1	12272.0000	G-US-3	12442.0000	N-AFS	12763.5000	G-WW-3
11513.5000	CG-US-8	12067.5000	G-US-3	12277.0000	SP-US-1	12481.1000	CG-US-5	12768.0000	M-US-3
11518.7000	G-US-1	12072.0000	AR-US-3	12280.0000	N-US-3	12481.7000	CG-US-5	12768.0000	M-WW-2
11520.0000	G-US-3	12078.0000	G-US-3	12282.0000	G-US-3	12482.0000	CC-CAN	12786.0000	CG-US-4
11522.5000	G-US-3	12080.0000	CC-CAN	12287.0000	SP-US-1	12482.3000	CG-US-5	12786.0000	CG-US-3
11531.0000	G-US-3	12090.0000	AR-US-1	12290.0000	CG-US-3	12490.0000	PR-US-6	12790.0000	CG-US-3
11532.5000	N-J	12094.5000	G-US-1	12290.0000	G-US-3	12491.0000	CG-US-8	12793.0000	N-URS
11538.0000	G-WW-3	12101.0000	G-US-3	12290.0000	BC-WW-1	12493.0000	CG-US-4	12799.5000	M-WW-2
11538.4000	N-US-4	12105.0000	G-US-3	12295.0000	CG-US-3	12493.0000	CG-US-3	12808.5000	M-US-3
11539.0000	N-US-4	12111.5000	G-US-3	12295.0000	G-US-3	12497.0000	CG-US-1	12814.0000	AF-CAN
11539.5000	N-US-4	12115.0000	CG-US-3	12296.0000	BC-WW-1	12497.0000	CG-US-4	12824.2000	N-G
11540.0000	N-US-4	12115.0000	G-US-3	12300.0000	N-G	12497.0000	CG-US-3	12826.5000	M-US-3
11541.0000	G-US-3	12124.0000	N-US-4	12300.0000	G-US-3	12497.0000	M-US-3	12843.0000	N-URS
11543.0000	G-US-3	12124.0000	G-US-3	12304.0000	G-US-3	12500.5000	G-US-9	12844.5000	M-US-3
11548.0000	SP-US-1	12126.0000	G-US-3	12306.0000	G-US-3	12501.0000	CG-US-1	12849.0000	M-WW-2
11550.0000	G-US-3	12126.5000	G-CAN-2	12307.0000	G-WW-3	12501.0000	CG-US-4	12850.0000	N-NOR
11553.0000	N-US-3	12127.0000	BC-WW-1	12310.0000	G-US-3	12501.0000	CG-US-3	12853.5000	M-WW-2
11555.0000	G-US-2	12127.5000	N-US-4	12311.0000	G-US-3	12501.0000	G-CAN-4	12867.0000	CG-CAN
11565.0000	N-J	12129.0000	AF-US-1	12327.0000	M-US-5	12501.5000	M-US-3	12871.5000	M-WW-2
11570.0000	N-US-1	12129.0000	G-US-1	12328.5000	N-URS	12502.5000	CG-US-8	12873.5000	M-WW-2
11570.0000	N-NZL	12130.0000	G-US-3	12330.0000	M-WW-1	12503.5000	CG-US-3	12874.0000	CG-CAN
11570.0000	N-SAM	12131.0000	G-US-3	12330.0000	PR-US-6	12504.5000	CG-US-1	12876.0000	SP-US-1
11572.0000	G-US-3	12135.0000	BC-WW-1	12333.1000	M-US-4	12504.5000	CG-US-4	12876.0000	M-WW-2
11573.0000	G-US-3	12150.0000	GC-US-6	12333.1000	M-WW-1	12510.5000	G-CAN-4	12880.5000	M-WW-2
11574.0000	G-US-3	12150.5000	N-URS	12336.2000	M-WW-1	12511.5000	G-CAN-4	12887.5000	CG-US-2
11575.0000	N-F	12152.0000	N-BEL	12339.3000	M-WW-1	12518.5000	CG-US-8	12887.5000	M-WW-2
11575.0000	BC-WW-1	12158.0000	G-US-1	12342.4000	CG-US-8	12519.5000	CG-US-8	12889.5000	CG-US-1
11580.0000	N-US-3	12160.0000	SP-US-1	12342.4000	M-WW-1	12520.0000	CG-US-3	12894.0000	G-US-9
11585.0000	BC-WW-1	12165.0000	BC-WW-1	12342.4000	M-WW-2	12520.0000	PR-US-6	12899.5000	M-WW-2
11590.0000	G-US-3	12168.0000	G-US-3	12344.0000	CG-US-3	12520.5000	CG-US-4	12908.5000	AR-US-1
11601.5000	CC-US-2	12171.0000	G-US-1	12344.0000	G-US-3	12520.5000	CG-US-3	12926.5000	M-US-3
11602.5000	N-NOR	12178.7000	G-US-1	12345.5000	M-WW-1	12521.0000	CG-US-3	12934.5000	CG-US-3
11605.0000	G-US-1	12179.0000	BC-WW-1	12348.6000	M-WW-1	12521.5000	CG-US-4	12934.5000	M-WW-2
11606.0000	CG-US-6	12180.0000	G-US-10	12351.7000	M-WW-1	12521.5000	M-US-3	12942.0000	M-J
11607.0000	AF-US-1	12181.0000	CC-CAN	12354.8000	M-WW-1	12523.0000	PR-US-6	12948.0000	M-WW-2
11619.5000	AF-US-8	12182.0000	N-SAM	12355.0000	AR-US-1	12530.0000	N-G	12952.5000	M-US-3
11623.0000	G-CAN-3	12183.0000	N-SAM	12357.9000	M-WW-1	12545.4000	CG-US-1	12952.5000	M-WW-2
11634.0000	SP-US-1	12185.5000	N-URS	12361.0000	M-WW-1	12546.6000	CG-US-1	12952.9000	M-US-3
11635.0000	G-US-3	12187.0000	G-US-10	12364.1000	M-WW-1	12568.0000	N-J	12961.5000	M-US-3
11636.0000	G-CAN-3	12188.5000	G-US-10	12367.2000	M-WW-1	12569.0000	CG-US-1	12961.5000	M-WW-2
11640.5000	G-US-3	12196.0000	G-US-10	12370.3000	G-US-9	12570.0000	N-URS	12966.0000	M-WW-2
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11653.0000	G-US-3	12205.0000	G-US-3	12373.4000	M-WW-1	12575.0000	N-URS	12980.0000	CG-US-3
11655.0000	N-US-4	12205.0000	BC-WW-1	12375.5000	M-CAN	12594.5000	CG-US-1	12984.2000	N-ISR
11660.0000	N-NOR	12210.0000	G-US-3	12375.5000	M-ATN	12597.0000	N-F	12985.0000	AF-CAN
11676.0000	G-US-3	12210.0000	BC-WW-1	12376.5000	M-WW-1	12605.0000	G-US-3	12988.5000	M-WW-2
11682.5000	AF-US-6	12211.0000	G-US-3	12379.6000	CG-US-8	12615.5000	CG-US-1	12994.0000	M-WW-2
11688.0000	G-US-3	12211.5000	G-US-3	12379.6000	M-WW-1	12640.5000	G-US-9	12997.5000	M-US-3
11689.0000	N-US-5	12213.0000	G-US-3	12382.7000	M-WW-1	12660.0000	M-US-3	13002.0000	M-US-3

13005.0000	CG-US-3	13175.2000	M-WW-1	13315.0000	A-WW-2	13495.0000	SP-US-1	13742.0000	SP-US-1
13011.0000	M-US-3	13178.3000	M-WW-1	13315.9000	G-US-3	13496.0000	G-US-3	13743.0000	AR-US-3
13015.3000	M-I	13180.4000	G-US-9	13316.0000	G-US-3	13498.0000	AF-US-8	13745.0000	CC-CAN
13019.0000	CG-US-7	13181.0000	N-US-1	13318.0000	A-WW-2	13502.0000	G-US-3	13747.0000	G-WW-3
13020.0000	CG-US-3	13181.4000	M-WW-1	13322.0000	G-US-3	13505.0000	N-URS	13756.0000	SP-US-1
13020.0000	G-WW-3	13184.5000	M-WW-1	13324.0000	A-US-1	13505.0000	AR-US-3	13759.0000	G-US-3
13024.9000	M-US-3	13187.6000	M-WW-1	13324.0000	A-WW-1	13507.0000	G-US-3	13760.0000	BC-WW-1
13027.5000	CG-US-3	13190.7000	M-WW-1	13327.0000	A-US-1	13508.5000	AR-US-3	13761.0000	G-US-3
13033.5000	M-US-3	13193.8000	M-WW-1	13327.0000	A-WW-1	13510.0000	AF-CAN	13770.0000	G-US-3
13038.0000	M-US-3	13196.9000	CG-US-8	13330.0000	A-US-1	13511.0000	AR-US-3	13770.0000	BC-WW-1
13051.5000	M-US-3	13196.9000	M-WW-1	13330.0000	A-WW-1	13512.0000	BC-WW-1	13776.0000	G-US-3
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13075.0000	CG-US-7	13207.0000	AF-US-9	13339.0000	A-US-1	13524.5000	AR-US-1	13810.0000	BC-WW-1
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16153.5000 N-US-3
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16430.0000 G-US-1
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16433.0000 BC-WW-1
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16452.0000 G-US-3
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16459.0000 G-US-3
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16460.0000 PR-US-6
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16466.2000 M-WW-1
16469.3000 M-WW-1
16470.0000 G-US-3
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16475.5000 M-WW-1
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16484.8000 M-WW-1
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16494.1000 G-US-9
16494.1000 M-WW-1
16497.2000 CG-US-8
16497.2000 M-WW-1
16500.3000 M-WW-1
16503.4000 M-WW-1
16505.5000 M-CAN
16505.5000 M-ATN
16506.5000 M-WW-1
16509.6000 M-WW-1
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16511.0000 PR-US-6
16512.7000 M-WW-1
16515.8000 M-WW-1
16518.9000 M-US-4
16518.9000 M-WW-1
16522.0000 M-WW-1
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16528.2000 M-WW-1
16531.3000 M-WW-1
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16568.5000 M-WW-1
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16590.2000 M-US-5
16590.2000 M-WW-1
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16593.3000 M-WW-1
16595.0000 G-US-3
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16608.0000 G-US-3
16623.0000 G-US-3
16634.0000 G-US-3
16638.1000 CG-US-5
16638.7000 CG-US-5
16639.0000 CC-CAN
16639.3000 CG-US-5
16641.0000 G-US-9
16648.0000 PR-US-6
16660.0000 CG-US-8
16662.0000 CG-US-4
16662.0000 CG-US-3
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16666.0000 CG-US-4
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16666.5000 M-US-3
16669.5000 G-US-9
16670.0000 CG-US-1
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16670.5000 M-US-3
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16673.5000 CG-US-1
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16673.5000 CG-US-3
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16680.5000 M-US-3
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16694.5000 CG-US-8
16695.0000 CG-US-3
16695.0000 PR-US-6
16695.5000 CG-US-4
16695.5000 CG-US-3
16696.0000 CG-US-3
16696.5000 CG-US-4
16696.5000 CG-US-3
16698.0000 M-US-3
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16728.8000 CG-US-1
16758.5000 CG-US-1
16760.0000 PR-US-6
16792.5000 CG-US-1
16800.9000 M-WW-2
16802.0000 G-US-3
16820.5000 CG-US-1
16854.5000 G-US-9
16861.7000 M-US-3
16871.3000 M-US-3
16880.0000 AF-CAN
16880.9000 CG-US-1
16880.9000 CG-US-4
16890.0000 PR-US-6
16895.3000 M-I
16902.0000 M-WW-2
16926.5000 CG-CAN
16933.2000 M-US-3
16945.0000 M-WW-2
16947.6000 M-WW-2
16948.0000 M-WW-2
16948.5000 CG-CAN
16951.5000 AF-F
16952.4000 M-WW-2
16959.2000 CG-US-3
16961.5000 N-F
16966.6000 CG-US-7
16968.0000 CG-US-4
16968.8000 CG-US-3
16972.0000 M-US-3
16973.4500 M-US-3
16976.0000 CG-US-1
16976.0000 M-WW-2
16980.4000 G-WW-3
16983.0000 CG-US-1
16983.2000 CG-US-4
16997.6000 M-US-3
17002.4000 CG-US-3
17005.0000 M-I
17007.2000 M-US-3
17007.2000 M-WW-2
17015.5000 N-URS
17016.0000 N-URS
17016.5000 N-URS
17016.5000 M-US-3
17016.8000 M-US-3
17017.0000 N-URS
17017.5000 N-URS
17018.0000 N-URS
17018.0000 G-WW-3
17018.5000 N-URS
17021.6000 M-US-3
17026.0000 M-US-3
17045.6000 M-WW-2
17061.0000 A-WW-2
17064.8000 M-WW-2
17074.4000 M-WW-2
17079.4000 M-WW-2
17084.0000 AF-CAN
17084.0000 G-US-9
17093.6000 M-US-3
17096.0000 G-WW-3
17104.2000 M-WW-2
17117.6000 M-US-3
17126.0000 G-US-3
17128.0000 G-US-3
17128.5000 M-WW-2
17132.0000 M-WW-2
17146.4000 CG-US-1
17146.4000 CG-US-4
17146.4000 CG-US-3
17146.4000 M-WW-2
17149.3000 CG-US-7
17151.2000 CG-US-3
17151.2000 CG-US-7
17160.8000 M-US-3
17160.8000 M-I
17161.0000 G-US-3
17161.3000 M-WW-2
17165.6000 M-WW-2
17170.4000 M-US-3
17170.4000 M-WW-2
17175.0000 CG-CAN
17175.0000 G-US-9
17175.2000 M-WW-2
17176.0000 M-WW-2
17180.0000 G-WW-3
17184.8000 M-US-3
17184.8000 M-WW-2
17189.6000 CG-US-3
17192.0000 CG-US-3
17194.4000 G-WW-3
17194.4000 M-WW-2
17199.0000 CG-US-4
17199.0000 CG-US-3
17201.0000 CG-US-7
17203.0000 CG-US-1
17203.0000 CG-US-4
17203.0000 CG-US-3
17203.0000 CG-US-7
17203.5000 M-US-3
17205.0000 CG-US-7
17206.5000 G-US-9
17207.0000 CG-US-1
17207.0000 CG-US-4
17207.0000 CG-US-3
17207.5000 M-US-3
17210.5000 CG-US-1
17210.5000 CG-US-4
17210.5000 CG-US-3
17212.5000 CG-CAN
17212.5000 G-CAN-4
17213.0000 G-CAN-4
17217.5000 M-US-3
17232.9000 M-WW-1
17232.9000 M-WW-2
17236.0000 M-WW-1
17239.1000 M-WW-1
17239.1000 M-I
17242.2000 CG-CAN
17242.2000 M-WW-1
17245.3000 M-WW-1
17248.4000 CG-US-8
17248.4000 M-WW-1
17248.4000 M-I
17251.5000 M-WW-1
17254.6000 CG-CAN
17254.6000 M-WW-1
17255.0000 G-US-3
17257.7000 M-WW-1
17260.8000 M-WW-1
17263.9000 M-WW-1
17267.0000 G-US-9
17267.0000 M-WW-1
17268.0000 G-US-9
17270.0000 G-US-4
17270.1000 CG-US-8

17270.1000	G-US-9	17485.0000	G-US-3	17961.0000	A-WW-2	18197.5000	CG-US-3	18667.0000	G-US-3
17270.1000	M-WW-1	17487.0000	AF-US-8	17964.0000	A-US-2	18205.0000	G-US-3	18668.0000	G-US-3
17273.2000	M-WW-1	17488.0000	CG-US-6	17964.0000	PR-US-6	18210.0000	BC-WW-1	18675.0000	N-J
17276.3000	M-WW-1	17488.6000	CG-US-6	17975.0000	AF-US-1	18212.5000	AR-US-3	18682.0000	G-US-3
17279.4000	M-WW-1	17490.0000	SP-US-1	17975.0000	AF-US-5	18215.0000	BC-WW-1	18685.0000	G-US-3
17280.8000	M-WW-2	17490.0000	BC-WW-1	17980.0000	AF/N-G	18226.0000	AF-US-6	18689.0000	G-US-3
17280.9000	G-US-9	17498.5000	AR-US-3	17983.0000	AF-AUS/NZL	18235.0000	G-US-3	18700.0000	G-US-3
17282.5000	M-WW-1	17501.5000	AR-US-3	17985.0000	N-US-1	18236.0000	G-US-3	18701.0000	G-US-3
17285.6000	M-WW-1	17503.0000	G-US-3	17992.0000	AF-D	18247.0000	G-US-3	18707.0000	G-US-3
17285.7000	M-WW-2	17507.0000	G-US-3	17993.0000	AF-AFS	18248.5000	G-US-3	18715.0000	G-US-3
17288.7000	M-WW-1	17517.0000	G-US-3	17995.0000	AF-CAN	18250.0000	G-US-3	18716.0000	G-US-1
17291.8000	M-US-4	17519.0000	G-US-1	18000.0000	SP-URS	18265.0000	BC-WW-1	18723.0000	G-US-3
17291.8000	M-WW-1	17520.0000	AR-US-3	18001.5000	AF-F	18275.0000	BC-WW-1	18743.0000	G-US-3
17294.9000	M-WW-1	17525.0000	G-US-1	18002.0000	AF-US-3	18285.0000	BC-WW-1	18744.0000	G-US-1
17294.9000	M-WW-2	17528.0000	G-US-3	18005.0000	AF-US-1	18297.0000	G-US-3	18750.0000	G-US-3
17298.0000	M-WW-1	17532.0000	G-US-3	18005.0000	AF-US-3	18300.0000	G-US-3	18758.0000	G-US-3
17300.5000	M-CAN	17538.0000	G-US-3	18006.0000	AF-D	18300.0000	BC-WW-1	18760.0000	G-US-3
17300.5000	M-ATN	17541.0000	G-US-3	18009.0000	N-US-1	18306.0000	G-US-3	18762.0000	G-US-3
17301.1000	M-WW-1	17542.0000	G-US-3	18009.0000	SP-US-1	18306.5000	G-US-3	18764.0000	G-US-10
17304.2000	M-WW-1	17548.0000	N-F	18012.0000	AF-CAN	18310.0000	BC-WW-1	18782.5000	BC-WW-1
17304.2000	M-I	17551.1000	G-WW-3	18014.0000	G-US-3	18317.0000	G-US-3	18785.0000	G-US-3
17307.3000	CG-US-7	17552.0000	G-US-3	18016.5000	N-URS	18320.0000	G-US-3	18802.0000	G-US-3
17307.3000	CG-US-8	17554.0000	G-US-3	18018.0000	AF/N-G	18321.0000	G-US-3	18803.0000	G-US-3
17307.3000	M-WW-1	17554.0000	SP-US-1	18019.0000	AF-US-2	18323.0000	G-US-3	18805.0000	G-US-3
17310.4000	M-WW-1	17556.0000	G-US-3	18019.0000	AF-US-3	18337.0000	G-US-3	18808.0000	G-US-3
17313.5000	M-WW-1	17560.0000	BC-WW-1	18027.0000	AF-CAN	18347.5000	N-URS	18810.0000	G-US-3
17316.6000	M-WW-1	17562.0000	G-US-3	18027.0000	AF-AUS/NZL	18348.0000	G-US-3	18830.0000	BC-WW-1
17319.7000	M-WW-1	17570.0000	G-US-3	18030.0000	G-US-3	18351.0000	G-US-3	18842.0000	G-US-3
17322.8000	M-WW-1	17576.0000	G-US-3	18030.0000	PR-US-1	18355.0000	G-US-3	18890.0000	G-US-3
17325.9000	M-WW-1	17580.0000	G-US-3	18030.0000	PR-US-6	18362.0000	G-US-3	18902.0000	G-US-3
17329.0000	M-WW-1	17580.0000	BC-WW-1	18035.0000	G-US-3	18365.0000	G-US-3	18909.0000	G-US-3
17332.1000	M-WW-1	17585.0000	G-US-3	18037.0000	G-US-3	18380.0000	G-WW-3	18933.0000	G-US-3
17335.2000	CG-CAN	17590.0000	N-SAM	18040.0000	G-US-3	18392.0000	G-US-3	18941.0000	G-US-3
17335.2000	M-WW-1	17590.0000	N-URS	18042.0000	G-US-3	18400.0000	G-US-3	18962.2000	CG-US-6
17336.0000	G-US-3	17594.0000	AR-US-3	18043.0000	G-US-3	18401.0000	G-US-3	18963.0000	CG-US-6
17338.3000	M-WW-1	17601.0000	PR-US-6	18045.0000	G-US-3	18402.0000	G-US-3	18964.0000	G-US-3
17341.4000	M-WW-1	17603.0000	G-US-3	18046.0000	AF-US-1	18403.0000	G-US-1	18968.0000	G-US-3
17341.4000	M-WW-2	17603.0000	G-US-12	18049.0000	AF-US-1	18403.0000	G-US-3	18969.0000	G-US-3
17344.5000	M-WW-1	17617.0000	AF-US-1	18050.0000	G-US-3	18417.4000	G-US-2	18972.0000	G-US-3
17347.3000	CG-US-8	17621.0000	G-US-10	18050.0000	G-US-8	18420.0000	G-US-3	18973.0000	G-US-3
17347.6000	M-WW-1	17624.0000	G-US-3	18051.0000	G-US-3	18421.0000	G-US-3	18988.0000	N-SAM
17348.0000	N-AFS	17625.0000	G-US-3	18052.0000	G-US-3	18430.0000	G-US-3	18990.0000	N-SAM
17350.7000	M-WW-1	17625.0000	G-US-10	18054.0000	CG-US-3	18435.0000	G-US-3	19002.0000	G-US-3
17353.8000	M-WW-1	17649.0000	G-US-1	18054.0000	G-US-3	18448.0000	G-US-3	19004.5000	AR-US-3
17356.9000	M-WW-1	17665.0000	G-US-3	18055.0000	G-US-3	18450.0000	G-US-3	19006.0000	G-US-3
17360.0000	PR-US-1	17665.0000	M-WW-2	18060.0000	G-US-3	18454.0000	G-US-3	19007.0000	G-US-3
17360.0000	PR-US-6	17668.0000	SP-US-1	18060.0000	SP-URS	18460.0000	BC-WW-1	19010.5000	AR-US-3
17361.5000	N-US-3	17669.0000	G-US-10	18062.0000	G-US-3	18460.5000	G-US-3	19012.0000	G-US-3
17362.0000	G-US-3	17670.0000	AF-US-8	18063.0000	G-US-3	18462.0000	G-US-3	19013.5000	AR-US-3
17365.0000	G-US-3	17670.0000	G-US-3	18065.0000	G-US-3	18468.0000	G-US-3	19014.5000	G-US-3
17367.0000	G-US-3	17695.0000	N-F	18068.0000	G-US-3	18480.0000	G-US-3	19015.0000	G-US-3
17368.0000	G-US-3	17700.0000	PR-US-6	18081.5000	M-WW-2	18488.0000	G-US-3	19016.0000	G-US-3
17375.0000	G-US-3	17720.0000	G-US-3	18092.0000	G-US-3	18499.0000	G-US-3	19020.0000	G-US-3
17380.0000	N-F	17850.0000	G-US-3	18110.0000	G-US-3	18500.0000	G-US-3	19022.0000	G-US-3
17385.0000	G-US-3	17894.0000	G-US-3	18112.0000	G-US-3	18505.0000	N-J	19024.0000	AR-US-3
17390.0000	G-US-3	17902.0000	G-US-9	18114.0000	G-US-3	18505.0000	G-US-3	19029.0000	AR-US-3
17395.0000	G-US-3	17902.5000	G-US-2	18115.0000	G-US-3	18515.0000	BC-WW-1	19042.0000	G-US-3
17397.0000	G-US-2	17904.0000	A-WW-2	18120.0000	G-US-3	18525.0000	G-US-3	19049.0000	PR-US-6
17403.0000	N-US-3	17907.0000	A-WW-2	18129.5000	AR-US-3	18530.0000	PR-US-2	19050.0000	G-US-3
17405.0000	G-US-12	17910.0000	A-WW-1	18137.5000	BC-WW-1	18531.0000	G-US-3	19055.0000	G-US-3
17419.0000	G-US-3	17916.0000	A-US-1	18143.0000	G-US-3	18545.0000	G-US-3	19060.0000	G-US-3
17421.0000	G-US-1	17916.0000	A-WW-1	18145.0000	G-US-3	18572.0000	G-US-3	19065.0000	G-US-3
17426.0000	G-US-3	17919.0000	A-US-1	18148.0000	G-US-3	18585.0000	G-US-3	19074.0000	G-US-3
17428.0000	G-US-3	17919.0000	A-WW-1	18150.0000	G-US-3	18586.0000	G-US-3	19075.0000	BC-WW-1
17428.0000	SP-US-1	17922.0000	A-US-1	18150.0000	BC-WW-1	18592.0000	G-US-3	19083.0000	N-AFS
17430.0000	G-US-3	17922.0000	A-WW-1	18155.0000	AF-US-8	18594.0000	AF-US-1	19090.0000	AR-US-1
17435.0000	G-US-3	17925.0000	A-US-1	18157.0000	BC-WW-1	18607.5000	BC-WW-1	19094.0000	G-US-3
17437.5000	G-US-3	17928.0000	A-WW-1	18160.0000	G-US-3	18612.0000	G-US-3	19101.0000	G-US-3
17444.0000	G-US-3	17931.0000	A-US-1	18162.5000	N-US-1	18615.0000	G-US-10	19124.0000	G-US-3
17445.0000	BC-WW-1	17931.0000	A-WW-1	18169.0000	G-US-3	18628.0000	G-US-3	19130.0000	G-WW-3
17448.0000	G-US-3	17934.0000	A-US-1	18172.0000	BC-WW-1	18630.0000	G-US-3	19130.0000	G-CAN-1
17450.0000	N-US-3	17934.0000	A-WW-1	18173.0000	G-US-12	18638.0000	G-US-3	19131.0000	PR-US-6
17450.0000	G-US-3	17936.0000	A-URS	18176.0000	G-US-3	18640.0000	G-US-3	19133.0000	G-US-3
17458.0000	G-US-3	17937.0000	A-US-1	18180.0000	CC-CAN	18643.0000	G-US-3	19146.0000	G-US-3
17459.0000	AR-US-3	17940.0000	A-US-1	18185.0000	G-US-3	18645.0000	G-US-3	19155.0000	BC-WW-1
17460.0000	AR-US-1	17940.0000	A-WW-1	18187.0000	G-US-3	18650.0000	G-US-3	19160.0000	G-US-3
17460.0000	G-US-3	17946.0000	A-WW-2	18190.0000	G-WW-3	18653.0000	BC-WW-1	19187.5000	N-US-4
17470.0000	SP-US-1	17955.0000	A-WW-2	18195.0000	BC-WW-1	18662.0000	G-US-3	19200.0000	AF-US-8
17481.5000	N-AUS	17958.0000	A-WW-2	18195.5000	CG-US-8	18666.0000	PR-US-6	19210.0000	G-US-3

19210.0000	BC-WW-1	19700.0000	G-US-3	20050.0000	G-US-3	20496.0000	G-US-3	20880.0000	G-US-3
19223.0000	G-US-1	19704.0000	G-US-3	20054.0000	G-US-3	20500.0000	BC-WW-1	20885.0000	AF-US-3
19226.0000	AF-US-8	19707.0000	G-US-3	20060.0000	G-US-3	20506.0000	G-US-3	20888.0000	G-US-3
19230.0000	G-US-3	19715.0000	G-US-3	20060.0000	BC-WW-1	20511.0000	AF/N-G	20890.0000	AF-US-1
19230.0000	G-US-8	19721.5000	BC-WW-1	20063.0000	G-US-1	20520.0000	AR-US-3	20895.0000	G-US-3
19231.0000	G-US-3	19725.0000	BC-WW-1	20073.0000	G-US-3	20520.0000	M-WW-2	20900.0000	G-US-3
19241.0000	G-US-3	19728.0000	G-US-3	20095.0000	G-US-1	20525.0000	G-US-3	20908.0000	G-US-3
19242.0000	G-US-3	19730.0000	G-US-3	20099.0000	G-US-3	20252.0000	N-US-4	20915.0000	G-US-3
19250.0000	N-NZL	19747.0000	G-US-3	20102.0000	G-US-3	20527.5000	G-US-3	20917.0000	G-US-3
19250.0000	G-US-3	19755.0000	BC-WW-1	20105.5000	AR-US-3	20529.5000	G-CAN-3	20920.0000	G-US-3
19256.6000	N-AUS	19757.0000	G-US-1	20123.0000	G-US-3	20545.0000	BC-WW-1	20921.5000	AR-US-3
19261.5000	BC-WW-1	19765.0000	G-US-3	20125.0000	G-US-3	20560.0000	AR-US-3	20929.0000	G-US-3
19270.0000	G-US-3	19780.0000	PR-US-2	20125.0000	BC-WW-1	20568.0000	G-US-3	20929.5000	G-US-3
19285.0000	AF-US-6	19785.0000	G-US-3	20129.0000	G-US-3	20569.0000	G-US-3	20932.0000	G-US-3
19291.0000	BC-WW-1	19791.5000	G-US-2	20130.0000	G-US-3	20571.0000	G-US-3	20937.5000	N-US-4
19295.0000	G-US-3	19800.0000	G-US-3	20130.0000	G-US-10	20580.0000	N-US-4	20938.0000	G-US-3
19295.0000	CC-CAN	19803.0000	G-US-3'	20148.0000	G-US-3	20605.0000	BC-WW-1	20939.0000	G-US-3
19296.0000	G-US-3	19805.0000	G-US-3	20149.0000	G-US-3	20610.0000	G-US-3	20940.0000	G-US-3
19296.5000	CG-US-6	19808.0000	CG-US-3	20150.0000	G-US-3	20620.0000	G-US-3	20942.0000	G-US-3
19297.1000	CG-US-6	19809.0000	G-US-3	20155.0000	G-US-3	20622.0000	G-US-3	20942.0000	PS-WW-1
19303.0000	G-US-3	19810.0000	G-US-3	20161.0000	G-US-3	20624.0000	G-US-3	20945.0000	G-US-3
19303.0000	SP-US-1	19815.0000	G-US-3	20164.0000	G-US-3	20625.0000	N-US-4	20948.0000	G-US-3
19317.0000	G-US-3	19816.0000	G-US-3	20165.0000	G-US-3	20631.0000	AF-US-1	20950.0000	G-US-3
19320.0000	G-US-3	19821.0000	G-US-3	20170.0000	G-US-3	20632.0000	G-US-3	20954.0000	G-US-3
19320.0000	BC-WW-1	19840.0000	AR-US-3	20177.0000	G-US-3	20650.0000	BC-WW-1	20955.0000	G-US-3
19321.0000	G-US-3	19845.0000	BC-WW-1	20187.0000	G-US-3	20650.5000	AR-US-3	20957.0000	AR-CAN
19330.0000	G-US-3	19850.0000	G-US-3	20188.5000	AF-US-8	20655.0000	AR-US-3	20957.0000	G-US-3
19335.0000	PR-US-2	19878.0000	G-US-3	20190.0000	G-US-3	20665.0000	AR-US-3	20958.0000	G-US-3
19360.0000	G-WW-3	19882.0000	G-US-3	20192.0000	BC-WW-1	20680.0000	N-US-4	20960.0000	AF-US-8
19360.0000	G-CAN-1	19882.0000	N-US-4	20215.0000	BC-WW-1	20682.0000	G-US-3	20960.0000	G-US-3
19385.0000	G-US-3	19885.0000	G-US-3	20221.0000	AR-US-3	20695.0000	G-US-3	20964.0000	G-US-3
19390.0000	G-US-3	19900.0000	G-US-3	20225.0000	G-WW-3	20700.0000	G-US-3	20970.0000	G-US-3
19395.0000	G-US-3	19904.0000	A-WW-1	20229.0000	G-US-3	20707.0000	G-US-3	20973.0000	G-US-3
19401.0000	G-US-3	19905.0000	G-US-3	20240.0000	N-F	20712.0000	G-US-3	20975.0000	N-BEL
19405.0000	G-WW-3	19912.5000	BC-WW-1	20245.0000	G-US-3	20720.0000	G-US-3	20975.0000	AF-US-3
19420.0000	G-US-3	19915.0000	BC-WW-1	20247.0000	CG-US-3	20722.0000	G-US-3	20977.0000	G-US-3
19425.0000	G-US-3	19918.0000	BC-WW-1	20259.0000	G-US-3	20728.0000	G-US-3	20980.0000	G-US-3
19428.0000	G-US-3	19918.5000	N-US-4	20261.0000	SP-US-1	20732.0000	G-US-3	20986.0000	G-US-3
19429.0000	G-US-3	19920.0000	G-US-3	20262.5000	CG-US-6	20735.0000	G-US-3	20988.5000	N-US-4
19430.0000	N-US-4	19922.0000	BC-WW-1	20264.0000	G-US-3	20735.0000	PS-WW-1	20990.0000	G-US-3
19435.0000	G-US-3	19934.0000	G-US-1	20265.0000	N-J	20737.0000	AF-US-1	20991.0000	AF-US-8
19440.0000	G-US-3	19937.0000	AF-US-8	20280.0000	BC-WW-1	20737.0000	AF-US-3	20991.5000	N-URS
19445.0000	G-US-3	19940.0000	PR-US-2	20319.0000	G-US-3	20737.0000	AF-US-8	20992.0000	N-URS
19452.0000	G-US-3	19945.0000	G-US-3	20321.0000	G-US-3	20740.0000	AF-US-3	20992.5000	AF-US-8
19455.0000	BC-WW-1	19950.0000	G-US-3	20322.0000	G-US-3	20740.0000	G-US-3	20992.5000	N-URS
19458.0000	G-US-3	19954.0000	SP-URS	20325.0000	BC-WW-1	20750.0000	G-US-3	20992.5000	AR-US-3
19463.0000	G-US-3	19955.0000	AF-US-6	20327.0000	G-US-3	20752.0000	G-US-3	20993.0000	N-URS
19465.0000	G-US-3	19956.5000	N-US-4	20330.0000	G-US-1	20753.0000	PS-WW-1	20993.5000	N-URS
19480.0000	BC-WW-1	19969.0000	G-US-1	20345.0000	BC-WW-1	20763.0000	AF-US-8	20993.5000	PS-WW-1
19495.0000	G-US-3	19973.0000	G-US-3	20348.0000	G-US-3	20765.0000	G-US-3	20994.0000	AF-US-8
19500.0000	G-US-3	19977.0000	G-US-3	20350.0000	N-SAM	20770.0000	G-US-3	20994.0000	N-URS
19501.0000	G-US-3	19985.0000	G-US-3	20353.0000	G-US-3	20775.0000	G-US-3	20994.5000	N-URS
19505.0000	BC-WW-1	19989.0000	SP-URS	20365.0000	G-US-3	20778.0000	G-US-3	20995.5000	AR-US-3
19512.0000	G-US-3	19990.0000	G-US-3	20369.0000	G-US-3	20781.0000	G-US-3	20996.0000	G-US-3
19514.0000	G-US-3	19994.0000	SP-URS	20373.0000	G-US-3	20788.0000	G-US-3	20998.5000	N-US-4
19518.0000	G-US-3	20000.0000	G-WW-3	20375.0000	G-US-3	20792.0000	G-US-3	21003.0000	G-US-3
19521.0000	G-US-3	20001.0000	G-US-3	20375.0000	N-US-4	20797.0000	G-US-3	21008.0000	G-US-3
19522.0000	BC-WW-1	20002.0000	G-US-3	20378.0000	G-US-3	20802.0000	G-US-3	21010.0000	G-US-3
19531.0000	AR-US-3	20004.0000	G-US-3	20381.0000	G-US-3	20805.0000	G-US-3	21300.0000	G-US-3
19532.5000	BC-WW-1	20007.0000	G-US-3	20390.0000	SP-US-1	20807.0000	AF-US-8	21450.0000	PR-US-6
19542.0000	CG-US-3	20008.0000	SP-URS	20398.0000	G-US-3	20808.0000	G-US-3	21455.0000	BC-WW-1
19542.0000	SP-URS	20010.0000	G-US-3	20402.0000	G-US-3	20810.0000	G-US-3	21727.0000	PR-US-6
19571.0000	G-US-3	20010.0000	PR-US-1	20405.0000	G-US-3	20812.0000	AR-US-3	21727.0000	CC-US-1
19572.5000	G-CAN-3	20010.0000	PR-US-6	20405.5000	G-US-2	20815.0000	PS-WW-1	21750.0000	PR-US-6
19585.0000	G-US-3	20011.0000	G-US-3	20413.0000	G-US-3	20825.0000	G-US-3	21751.0000	G-US-3
19612.0000	AF-US-8	20012.0000	G-US-3	20417.0000	G-US-3	20830.0000	G-US-3	21755.0000	G-US-3
19615.0000	AF-US-8	20014.0000	G-US-3	20419.0000	G-US-3	20840.0000	G-US-3	21760.0000	CG-US-7
19616.0000	N-SAM	20020.0000	G-US-3	20420.0000	G-US-3	20843.0000	G-US-1	21760.0000	BC-WW-1
19617.0000	G-US-3	20021.0000	G-US-3	20422.0000	G-US-3	20846.0000	AF-US-1	21763.0000	G-US-3
19630.0000	G-US-3	20022.0000	G-US-3	20450.0000	G-US-3	20850.0000	G-US-3	21764.0000	G-US-3
19632.0000	G-US-3	20023.0000	G-US-3	20455.0000	G-US-3	20852.0000	G-US-10	21767.0000	AF-US-6
19635.0000	G-US-3	20025.0000	BC-WW-1	20455.0000	BC-WW-1	20855.0000	AF-US-4	21773.0000	G-US-3
19636.0000	G-US-3	20027.0000	G-US-1	20458.0000	G-US-3	20860.0000	G-US-3	21785.0000	G-WW-3
19640.0000	SP-US-1	20028.0000	G-US-3	20473.0000	G-US-3	20868.0000	G-US-3	21785.0000	G-CAN-1
19662.0000	G-US-3	20030.0000	G-US-3	20475.0000	N-J	20870.0000	AF-US-8	21792.0000	N-SAM
19662.0000	CG-US-3	20035.0000	G-US-3	20475.0000	SP-US-1	20873.0000	AF-US-7	21800.0000	BC-WW-1
19668.0000	G-US-3	20038.0000	G-US-3	20480.0000	G-US-3	20873.0000	AF-US-8	21804.0000	N-US-3
19671.5000	N-US-4	20043.7000	G-US-3	20480.0000	G-US-10	20874.0000	G-US-3	21805.5000	N-US-3
19676.0000	G-US-3	20044.0000	G-US-3	20492.0000	G-US-3	20875.0000	PR-US-1	21807.5000	G-WW-3

21807.5000	G-CAN-1	22031.0000	M-WW-1	22284.0000	CG-US-1	22611.5000	M-WW-1	22975.0000	G-US-1
21810.0000	G-US-3	22034.1000	M-WW-1	22292.0000	CG-US-3	22514.6000	M-WW-1	22990.0000	SP-US-1
21810.0000	SP-US-1	22037.2000	M-WW-1	22310.5000	N-URS	22617.7000	M-WW-1	22996.0000	G-US-3
21811.5000	G-US-3	22040.3000	M-WW-1	22315.5000	M-WW-2	22623.9000	M-WW-1	23000.0000	G-US-3
21815.0000	AF-US-1	22043.0000	PR-US-6	22324.5000	M-US-3	22627.0000	M-WW-1	23001.0000	G-US-3
21817.0000	G-US-3	22043.4000	M-WW-1	22336.5000	AF-CAN	22627.0000	M-1	23014.0000	G-US-3
21825.5000	AR-US-3	22044.8000	M-WW-1	22340.0000	N-URS	22630.1000	M-WW-1	23030.0000	G-US-3
21828.5000	G-US-2	22046.5000	M-WW-1	22345.0000	G-US-12	22633.2000	M-WW-1	23035.0000	G-US-8
21834.0000	N-US-3	22049.6000	M-WW-1	22347.5000	M-US-3	22636.3000	M-WW-1	23035.0000	SP-US-1
21840.0000	G-US-3	22052.7000	CG-US-8	22348.5000	M-US-3	22639.4000	M-WW-1	23068.5000	G-CAN-3
21842.0000	G-US-3	22052.7000	M-WW-1	22360.0000	PR-US-6	22642.5000	M-WW-1	23100.0000	G-US-3
21843.0000	G-US-3	22058.9000	M-WW-1	22366.5000	M-US-3	22645.6000	M-WW-1	23100.0000	PR-US-6
21845.0000	N-F	22062.0000	M-WW-1	22372.4000	M-1	22648.7000	CG-US-8	23104.0000	G-US-3
21846.0000	G-US-3	22065.1000	M-WW-1	22378.0000	M-1	22648.7000	M-WW-1	23106.0000	G-US-3
21847.0000	G-US-3	22068.2000	M-WW-1	22384.0000	M-WW-2	22654.9000	CG-CAN	23157.0000	G-US-3
21854.5000	G-US-3	22071.3000	M-WW-1	22387.0000	CG-CAN	22654.9000	M-WW-1	23177.0000	N-US-1
21856.0000	G-US-3	22074.4000	M-WW-1	22407.0000	CG-US-3	22658.0000	M-WW-1	23181.0000	G-US-3
21860.0000	AF-AFS	22077.5000	M-WW-1	22412.0000	M-WW-2	22658.0000	M-WW-2	23191.0000	BC-WW-1
21870.0000	PR-US-1	22080.6000	M-WW-1	22413.0000	M-WW-2	22661.1000	M-WW-1	23206.0000	AF-US-2
21870.0000	PR-US-6	22083.7000	M-WW-1	22419.0000	M-WW-2	22554.2000	M-WW-1	23210.0000	G-US-3
21876.0000	G-US-3	22085.0000	N-AFS	22425.0000	M-WW-2	22667.3000	M-WW-1	23211.0000	G-US-10
21882.0000	G-US-3	22086.8000	M-WW-1	22429.4000	G-US-9	22670.4000	M-WW-1	23220.0000	AF/N-G
21886.0000	AF/N-G	22089.9000	M-WW-1	22431.0000	M-US-3	22673.5000	M-WW-1	23224.0000	N-US-1
21890.0000	G-US-3	22093.0000	M-WW-1	22446.0000	M-WW-2	22676.6000	M-WW-1	23227.0000	AF-US-3
21931.0000	A-US-2	22096.1000	M-WW-1	22458.0000	M-US-3	22679.7000	M-WW-1	23227.0000	N-US-1
21931.0000	PR-US-6	22099.2000	G-US-9	22467.0000	M-US-3	22682.8000	M-WW-1	23240.0000	G-US-10
21931.0000	CC-US-1	22099.2000	M-22-1	22472.0000	CG-US-7	22685.9000	M-WW-1	23250.0000	AF-CAN
21937.0000	G-US-9	22099.4000	G-US-9	22472.5000	CG-US-7	22689.0000	M-WW-1	23254.0000	AF-F
21940.0000	A-US-1	22102.3000	M-WW-1	22473.0000	M-WW-2	22692.1000	M-WW-1	23272.0000	G-US-3
21940.0000	A-WW-1	22105.4000	G-US-9	22474.0000	M-WW-2	22695.0000	G-US-4	23281.0000	SP-US-1
21943.0000	A-US-1	22105.4000	M-WW-1	22476.0000	CG-US-1	22695.2000	G-US-9	23287.0000	AF-AFS
21943.0000	A-WW-1	22106.4000	G-US-9	22476.0000	M-WW-2	22695.2000	M-WW-1	23288.0000	N-US-1
21946.0000	A-US-1	22108.5000	M-WW-1	22479.0000	M-US-3	22698.3000	M-WW-1	23331.5000	G-US-10
21946.0000	A-WW-1	22109.4000	G-US-9	22485.0000	M-US-3	22700.0000	G-US-9	23337.0000	AF-US-1
21949.0000	A-US-1	22111.6000	M-WW-1	22487.0000	M-US-3	22701.4000	G-US-9	23342.0000	G-US-3
21949.0000	A-WW-1	22114.7000	M-WW-1	22487.5000	CG-US-3	22701.4000	M-WW-1	23345.0000	G-US-10
21952.0000	A-US-1	22117.8000	M-WW-1	22502.0000	M-WW-2	22701.5000	G-US-4	23350.0000	PR-US-6
21952.0000	A-WW-1	22120.9000	M-WW-1	22503.0000	M-US-3	22704.5000	M-WW-1	23355.0000	N-US-4
21953.0000	G-US-3	22124.0000	M-WW-1	22515.0000	M-US-3	22707.6000	M-WW-1	23360.0000	AF-US-6
21955.0000	A-US-1	22124.0000	PR-US-6	22518.0000	M-US-3	22710.7000	M-WW-1	23363.0000	G-US-3
21955.0000	A-WW-1	22126.0000	AR-US-1	22521.0000	M-US-3	22711.0000	G-US-3	23370.0000	G-US-3
21958.0000	A-US-1	22127.0000	M-WW-1	22527.0000	CG-US-1	22713.8000	M-WW-1	23376.0000	G-US-3
21958.0000	A-WW-1	22130.2000	M-WW-1	22527.0000	CG-US-4	22716.9000	M-WW-1	23385.0000	G-US-3
21961.0000	A-US-1	22133.3000	M-WW-1	22527.0000	CG-US-3	22720.0000	PR-US-6	23402.0000	G-US-12
21965.0000	G-US-3	22136.4000	M-WW-1	22533.0000	M-WW-2	22722.0000	G-US-3	23403.0000	PR-US-6
21967.0000	A-US-1	22162.1000	CG-US-5	22536.0000	G-WW-3	22722.0000	M-US-5	23413.0000	SP-US-1
21967.0000	A-WW-1	21262.7000	CG-US-5	22539.0000	M-WW-W	22729.0000	G-US-3	23419.0000	AF-US-1
21970.0000	A-US-1	22163.0000	CC-CAN	22545.0000	N-F	22732.0000	G-US-3	23425.0000	G-US-3
21970.0000	A-WW-1	22163.3000	CG-US-5	22545.0000	CG-US-1	22738.0000	SP-US-1	23442.5000	G-US-3
21973.0000	A-US-1	22178.0000	PR-US-6	22545.0000	CG-US-4	22740.0000	G-US-3	23460.0000	G-US-3
21973.0000	A-WW-1	22184.0000	CG-US-3	22545.0000	CG-US-3	22748.5000	N-URS	23474.0000	G-US-10
21976.0000	A-US-1	22192.0000	CG-US-8	22557.0000	M-US-3	22755.0000	SP-US-1	23478.0000	G-US-3
21979.0000	A-US-1	22194.0000	CG-US-4	22561.0000	CG-US-3	22793.0000	G-US-3	23479.0000	SP-US-1
21979.0000	A-WW-1	22198.0000	CG-US-1	22563.0000	CG-US-4	22796.0000	G-US-3	23485.0000	SP-US-1
21980.0000	G-US-3	22198.0000	CG-US-3	22563.0000	CG-US-3	22800.0000	G-US-3	23490.0000	N-F
21982.0000	A-US-1	22198.0000	CG-US-4	22567.0000	CG-US-3	22809.0000	G-US-3	23560.0000	G-US-3
21985.0000	A-US-1	22198.5000	M-US-3	22567.0000	CG-US-4	22810.0000	N-SAM	23570.0000	G-US-3
21985.0000	A-WW-1	22201.5000	G-US-9	22567.0000	CG-US-7	22818.0000	G-US-3	23584.0000	G-US-3
21988.0000	A-US-1	22202.0000	CG-US-1	22567.0000	M-WW-2	22820.0000	G-US-3	23635.0000	G-US-3
21988.0000	A-WW-1	22202.0000	CG-US-4	22567.5000	M-US-3	22822.4000	CG-US-6	23642.0000	G-US-3
21991.0000	A-US-1	22202.5000	M-US-3	22570.5000	G-US-9	22823.0000	CG-US-6	23651.4000	G-US-9
21991.0000	A-WW-1	22203.5000	CG-US-8	22571.0000	{CG-US-1	22830.0000	G-US-3	23661.0000	SP-US-1
21994.0000	A-US-1	22205.5000	CG-US-1	22571.0000	CG-US-4	22834.5000	G-CAN-3	23675.0000	G-US-12
21994.0000	A-WW-1	22205.5000	CG-US-3	22571.5000	M-US-3	22848.0000	G-US-3	23680.0000	BC-WW-1
21997.0000	A-US-1	22205.5000	CG-US-4	22572.5000	CG-US-7	22880.0000	G-US-3	23826.0000	BC-WW-1
22000.0000	M-WW-1	22207.5000	G-CAN-4	22574.5000	CG-US-1	22886.0000	G-US-3	23840.0000	SP-US-1
22000.0000	PR-US-6	22221.0000	G-CAN-4	22574.5000	CG-US-4	22903.0000	PR-US-6	23856.0000	BC-WW-1
22003.1000	M-WW-1	22224.5000	CG-US-8	22574.5000	CG-US-3	22925.0000	BC-WW-1	23860.0000	G-US-3
22006.2000	M-WW-1	22226.0000	M-US-3	22576.0000	CG-US-7	22926.0000	G-US-1	23862.0000	AF-US-8
22009.3000	M-WW-1	22226.0000	PR-US-6	22576.5000	G-CAN-4	22930.0000	BC-WW-1	23862.5000	G-US-3
22012.4000	M-WW-1	22226.5000	CG-US-4	22590.0000	CG-CAN	22947.0000	AF-US-8	23863.5000	AF-US-8
22015.5000	CG-US-8	22226.5000	CU-US-3	22590.0000	G-CAN-4	22950.0000	AF-US-8	23865.0000	AF-US-8
22015.5000	M-WW-1	22232.0000	CG-US-1	22596.0000	M-WW-1	22950.0000	G-US-3	23865.0000	G-US-3
22018.6000	M-WW-1	22234.0000	CG-US-1	22599.1000	M-WW-1	22955.0000	G-US-3	23875.0000	G-US-12
22021.7000	M-WW-1	22245.0000	G-WW-3	22602.2000	M-WW-1	22960.0000	N-BEL	23940.0000	SP-US-1
22024.8000	M-WW-1	22251.5000	G-US-9	22605.3000	M-W-1	22960.0000	G-US-3	23952.0000	G-US-3
22025.9000	G-US-9	22252.0000	G-US-9	22608.4000	M-WW-1	22964.0000	G-US-7	23964.0000	G-US-3
22027.9000	M-WW-1	22253.0000	CG-US-1	22608.4000	M-WW-2	22966.5000	G-U8S-3	23975.0000	G-US-3
22030.0000	G-US-3	22270.0000	CG-US-1	22611.5000	CG-US-8	22970.0000	BC-SS-1	23982.5000	G-US-3

23985.0000	N-F	26910.0000	AF-US-8	29720.0000	PR-US-6
23995.0000	G-US-3	26965.0000	PR-US-7	29720.0000	CC-US-1
24000.0000	G-US-3	26975.0000	PR-US-7	29892.0000	CG-US-4
24005.0000	G-US-3	26985.0000	PR-US-7	29909.0000	CG-US-4
24012.5000	AR-US-3	27005.0000	PR-US-7	29920.0000	CC-CAN
24019.0000	AF-US-8	27015.0000	PR-US-7	29930.0000	PR-US-6
24040.0000	G-US-1	27025.0000	PR-US-7	29930.0000	CC-US-1
24050.0000	AR-US-3	27035.0000	PR-US-7	29930.0000	PR-US-6
24060.0000	N-F	27055.0000	PR-US-7		
24072.0000	G-WW-3	27065.0000	PR-US-7		
24088.5000	CG-US-6	27075.0000	PR-US-7		
24110.0000	G-WW-3	27085.0000	PR-US-7		
24110.0000	G-CAN-1	27105.0000	PR-US-7		
24170.0000	N-US-4	27115.0000	PR-US-7		
24197.5000	AR-US-3	27120.0000	PR-US-3		
24240.0000	SP-US-1	27125.0000	PR-US-7		
24266.5000	N-US-4	27135.0000	PR-US-7		
24300.0000	G-US-3	27155.0000	PR-US-7		
24330.0000	G-US-3	27165.0000	PR-US-7		
24350.0000	N-US-4	27175.0000	PR-US-7		
24460.0000	N-F	27185.0000	PR-US-7		
24560.0000	AR-US-3	27205.0000	PR-US-7		
24573.0000	G-US-3	27215.0000	PR-US-7		
24573.0000	G-SU3	27225.0000	PR-US-7		
24573.5000	AF-US-8	27235.0000	PR-US-7		
24612.0000	G-US-3	27245.0000	PR-US-7		
24761.5000	AR-US-3	27265.0000	PR-US-7		
24780.0000	SP-US-1	27275.0000	PR-US-7		
24793.0000	G-US-1	27285.0000	PR-US-7		
24800.0000	G-US-3	27295.0000	PR-US-7		
24806.0000	G-US-3	27305.0000	PR-US-7		
24860.0000	AR-US-3	27315.0000	PR-US-7		
24914.0000	SP-US-1	27325.0000	PR-US-7		
24930.0000	PR-US-6	27335.0000	PR-US-7		
25005.0000	PR-US-6	27345.0000	PR-US-7		
25035.0000	G-US-3	27355.0000	PR-US-7		
25041.0000	G-US-3	27365.0000	PR-US-7		
25085.8000	CG-US-1	27375.0000	PR-US-7		
25100.0000	PR-US-6	27385.0000	PR-US-7		
25147.5000	G-CAN-3	27395.0000	PR-US-7		
25149.0000	G-CAN-3	27400.0000	G-US-3		
25150.5000	G-CAN-3	27405.0000	PR-US-7		
25161.0000	SP-US-1	27410.0000	PR-US-6		
25198.0000	SP-US-1	27440.0000	PR-US-6		
25230.0000	PR-US-6	27440.0000	CC-US-1		
25230.0000	CC-US-1	27540.0000	CG-US-8		
25245.0000	SP-US-1	27542.0000	CG-US-4		
25343.0000	PR-US-6	27575.0000	G-US-7		
25350.0000	BC-WW-1	27585.0000	G-US-7		
25380.0000	CG-US-1	27590.0000	CG-US-4		
25380.0000	CG-US-4	27655.0000	G-CAN-2		
25380.0000	CG-US-3	27720.0000	SP-US-1		
23416.0000	CG-US-4	27736.0000	AF-US-8		
25461.0000	M-WW-2	27740.0000	G-US-12		
25490.0000	G-US-1	27740.0000	PR-US-6		
25500.0000	G-US-3	27785.0000	CG-US-4		
25516.0000	N-SAM	27829.0000	AF-US-8		
25590.0000	G-WW-3	27845.0000	G-WW-3		
25600.0000	PR-US-6	27870.0000	AF-US-1		
25800.0000	PR-US-6	27877.0000	AF-US-8		
26131.0000	G-US-3	27900.0000	N-US-4		
26356.0000	SP-US-1	27950.0000	N-US-4		
26389.0000	SP-US-1	27963.5000	N-US-4		
26450.0000	G-US-3	27975.5000	N-US-R		
26490.0000	BC-WW-1	27978.5000	AF-US-8		
26515.0000	AF-US-3	27985.0000	AF-US-8		
26515.0000	SP-US-1	27991.0000	AF-US-8		
26620.0000	AF-US-7	27994.0000	AF-US-8		
26640.0000	BC-WW-1	27998.0000	PS-WW-1		
26660.0000	G-US-3	28965.5000	N-URS		
26680.0000	BC-WW-1	29520.0000	PR-US-7		
26703.0000	G-US-1	29540.0000	PR-US-7		
26710.0000	AF-US-3	29560.0000	PR-US-7		
26760.0000	G-US-3	29620.0000	PR-US-7		
26800.0000	G-US-3	29640.0000	PR-US-7		
26824.4000	CG-US-6	29660.0000	PR-US-7		
26825.0000	CG-US-6	29680.0000	PR-US-7		
26877.5000	N-US-4	29700.0000	PR-US-6		
26905.0000	G-US-1	29701.5000	PS-WW-1		

THE LISTENER'S LOG

The LISTENER'S LOG accommodates entries for any type of transmission heard at any frequency, and includes column headings of all of the most useful information collected by monitoring stations.

FREQUENCY:
The carrier frequency of the station should be indicated in kilohertz or megahertz.

AGENCY:
VOA, USN, ham, some way of identifying the nature of the station service.

LOCATION:
Atlanta, Cuba, Atlantic Ocean, deep space...whatever!

CALLSIGN:
Identifications like KKN50, WA4PYQ, Houston Control, Unit 2, Alfa Tango.

EMISSION:
Use simple indications like AM, SSB, CW, RTTY, FAX. For technical accuracy, use official designators.

SIGNAL:
A received signal has many qualities, including strength and intelligibility. Two common methods are used for the assessment of signals:

1) SINPO CODE-The most comprehensive method of rating the quality of a signal is shown below:

Rating	Signal Strength	Interference from stations	Noise (static)	Propagation Fading	Overall Merit
5	excellent	none	none	none	excellent
4	good	slight	slight	slow	good
3	fair	moderate	moderate	moderate	fair
2	poor	severe	severe	fast	poor
1	barely audible	extreme	extreme	very fast	unusable

2) RST SYSTEM - Readability, signal strength and tone quality are used to rate CW signals; voice signals are rated using only the R&S scales.

Readability	Signal Strength	Tone (Morse code)
1. unreadable	1. barely perceptible	1. extremely raspy sound
5. perfectly readable	9. extremely strong	9. pure, clean pitch

TIME/DAY/DATE:
You should record your reception time in 24 hour Universal Coordinated Time (UTC). A 24 hour clock is helpful. The day of the week is important because most broadcast programming and communications network schedules follow the calendar. Log the date as well for reference and remember, it will be tomorrow on your log before it is midnight in your time zone because of the difference between local and Universal time!

ADDITIONAL INFORMATION:
Whether the signal heard was an aircraft, ship, on a rescue mission or whatever, record helpful information in this last column.

LISTENER'S LOGSHEET

FREQUENCY kHz / MHz	AGENCY OR SERVICE	LOCATION OR BEARING	CALL SIGN OR IDENTIFICATION	EMISSION MODE	SIGNAL QUALITY	TIME/DAY/DATE	ADDITIONAL INFORMATION

LISTENER'S LOGSHEET

FREQUENCY kHz / MHz	AGENCY OR SERVICE	LOCATION OR BEARING	CALL SIGN OR IDENTIFICATION	EMISSION MODE	SIGNAL QUALITY	TIME/DAY/DATE	ADDITIONAL INFORMATION

LISTENER'S LOGSHEET

FREQUENCY kHz / MHz	AGENCY OR SERVICE	LOCATION OR BEARING	CALL SIGN OR IDENTIFICATION	EMISSION MODE	SIGNAL QUALITY	TIME/DAY/DATE	ADDITIONAL INFORMATION

ADDENDA

We pride ourselves in accuracy. At press time it's not unusual for a number of additions and deletions to surface and we are pleased to present these to you. If you discover others, please let us know so that we can share them with other users of this comprehensive directory. Thank you.

Page	Correction
43	United Kingdom call sign is GYU, not GUY.
43	Inter-American Naval Telecommunications call signs, delete CCQ and CCES; add CCS (Santiago) and CCV (Valpariso)
67	Delete Sagebrush listing (decommissioned)
105	National Marine Fisheries Service, add to WWD 17105
113	Delete all DAM listings
113	Delete DIZ listing
113	Delete all FFH, FTA91, FTH42, FTK77, FTN87 listings
113	Correct call sign is HD2IOA, not HD210A
113	Add NPO Subic Bay, Philippines, 4445 10440.5 12804 (0555-0600, 1155-1200, 1755-1800, 2355-2400)
114	Delete 4625 DAM, 6475.5 DAM, 8638.5 DAM, 12763.5 DAM, 16980.4 DAM
114	Delete DAM from 4525 listing (Y3S remains)
114	Delete FFH from 7500 (VNG remains), 91.15 FTA91, 7428 FTH42, 10775 FTK77, 13873 FTN87
114	ADD 4445 NPO, 10440.5 NPO, 12804 NPO

GUARANTEE

You must be 100% satisfied or call our toll-free line (1-800-438-8155) within 15 days of shipping date and request a return authorization number. Upon receipt of the product in original packaging and new condition, we will refund your money, less shipping, or give you credit toward another product—your choice. Be sure to include authorization number as a 10% restocking charge must be assessed for products returned without authorization. Special order items cannot be returned.

All equipment manufactured by Grove is warranted against manufacturing defects for a period of one year under normal use by the purchaser, providing that no modifications or field repairs have been attempted.

If any equipment should fail during the warranty period, Grove shall repair or replace that defective equipment upon its postpaid return. The warranty does not cover hazard to person or associated equipment or property. Your warranty is considered to be in effect from the date of shipment to you. Violations of the warranty clauses will automatically void the warranty and services or repairs will be charged to the owner.

Service outside of the warranty will be charged at the cost of parts, labor, and return shipping. Payment for repairs must be received before the repaired unit can be returned.

When service or repairs appear necessary we urge you to call or write Grove to determine if the problem can be solved without returning the unit. Should return of the unit be required, you will be assigned a return authorization number. Be sure to place this number in plain view on the address side of your return package. This will allow us to expedite servicing the unit and return it to you.

Products not manufactured by Grove carry the warranty of the individual manufacturers. If you have a problem with a piece of equipment, please call and we will put you in touch with the closest repair service.

How We Pick Our Products

The consumer electronics marketplace offers a bewildering array of products; it is impossible for the prospective buyer to be familiar with them all. After careful evaluation, we select those products which we feel offer the best value to our customers and feature them in our catalog.

PRECAUTION CAN SAVE TIME AND TROUBLE

When your shipment arrives, immediately check it for any shipping damage. If there appears to be damage to the box, immediately notify your delivery man BEFORE signing for the package. Inspect the contents and if there is damage, refuse the package. Call our offices advising of the problem and we will ship another unit to you. If you accept a package, then find it has been damaged, SAVE THE SHIPPING BOX and call your UPS office to report the damage; then call our office at 1-800-438-8155 and we will ship a new unit to you as soon as UPS notifies us of the damage.

Bob Grove
WA4PYQ

Judy Grove

TO SPEED YOUR ORDER FOLLOW THESE SIMPLE STEPS

MAIL ORDER

1. Fill out the order blank and send a check, bank or postal money order, or your complete charge card information (see #3 below) to Grove Enterprises, P.O. Box 98, Brasstown, N.C. 28902.
2. *DO NOT SEND CASH!* COD is available for $3 per package via UPS (no COD's through Post Office). Cash, certified check or money order required at time of COD delivery. If COD shipment is refused, we will *NOT* ship again until payment for shipping charges of first shipment is received.

PHONE ORDERS

1. Have your order form filled out and your *charge card in front of you.* (Minimum charge card order, $15).
2. Call our order desk toll free, 1-800-438-8155 (N.C. call collect 1-704-837-9200). Hawaii, Alaska, foreign countries call 1-704-837-9200 (no collect calls please!)
3. Give the secretary your name, shipping address for UPS delivery (and mailing address if different from shipping address), what you wish to order, your charge card number and the expiration date. *IF THIS IS YOUR FIRST ORDER* we *must* have the name and location of the bank which issued your card and the address shown on your charge card records. If this is not possible, we will require a money order or certified check before the item can be shipped. (This method is necessary to eliminate fraudulent use of credit cards).

SPECIAL SHIPPING INFORMATION

All **Hawaii** shipments via UPS must go Blue Label (ask for charges). Blue Label and Next Day Air available from UPS; Express and Priority Mail available from the U.S. Post Office. Call or write for charges.

PURCHASE ORDERS

Written purchase orders will be accepted from city, state and federal agencies and institutions. Terms are net 10—1½% over 30. Special sale prices are not honored on open accounts

DELIVERY SCHEDULE

We ship within one working day upon *RECEIPT OF YOUR ORDER* unless you are notified of a delay. UPS shipments should arrive within 10 working days; U.S. Post Office shipments within 14 working days (bookrate can take as much as four weeks). These are maximum delivery times; if you do not receive your order within these time frames, call us so we can place a tracer on your order.

FOREIGN SHIPMENTS

Write or call, telling us what you want and how you want it shipped (surface or air parcel post; shipments can be made by Burlington Air Freight or UPS to Canada and some European countries). Please note—orders to some countries cannot be insured by the Post Office. We do not assume any responsibility for losses other than proof of shipment . . . *ALL PAYMENTS MUST BE IN U.S. DOLLARS* BY VISA, MC, POSTAL MONEY ORDER *OR* BANK CHECK DRAWN ON A U.S. BANK WITH FEDERAL RESERVE TRANSIT NUMBERS **IMPRINTED** ON BOTTOM OF CHECK.

ORDER BLANK

If this is your first order, where did you hear about Grove Enterprises? _____

SHIP TO: Name _____

Street Address (for UPS delivery) _____

_____

City _____ **State** _____ **Zip** _____

Phone: (Area Code) _____

MAILING ADDRESS IF DIFFERENT FROM STREET ADDRESS:

P.O. Box _____

City _____ **State** _____ **Zip** _____

PAYMENT METHOD:

☐ CHECK ☐ MONEY ORDER
☐ VISA ☐ MASTERCARD

How do want your order shipped?

☐ **UPS** ☐ **U.S. Postal Service**

Product	Qnty.	Price	SHIPPING CHARGE	TOTAL

If ordering a subscription to Monitoring Times also—please make payment for MT on a separate check made payable to Monitoring Times. *Thank You.*

CARD NUMBER, IF APPLICABLE:

_____

Name of Issuing Bank _____ **Exp. Date** _____

_____
Signature

Total $ _____

N.C. Residents only add 5% on Product Total $ _____

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